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CGTGCCGCCCTCGACGTACTCCCGCGGTACGGACCTGAAGGCCTCCTCCGCCG  
25 TCCTCACCATCACTGGGAGATTCATGACTGCCAACGTCAACGCTCCTGCGAGGA  
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30 CAAGGCGGGGTATAACGAGCTGTGGACGGGGTCCCCGATGTTGATAGGACCG  
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TCATCAGTTTACTCACGATTACCGGATTCAGCCGAGCGTGGTGTGACTTGCGCT  
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35 ACACCGGTTACCATCAGCATCAGCACGAGGCCTCCGAAGTACAGAGCGTAATA  
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GACCAACGCCACGGCAACGGTCTCACCCATCGCCCTCAGAGTACCCAGCATGC  
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40 TGCCATCGAGTCGCTCCCATTCCTCAACGCGGCCTCCACGTACTCTCGCGGAAC  
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45 TGGAGCGAACTCGGCCAGATAAGTCGCGCAAAGCAGCGAAATCGGGAAGGCTA  
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50 TTAGATTCTCAGACTCCTGGGCTTGCTTCGCGGCAACTTCCCGCATCACTGGTC  
CCCCGGTGGGATTTGATAAAGATCTTTAGGAGGATCGAAGAGGAGCCGCCAA  
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5 CGGCACCTTACCGCCCTTCTTGGCTTTGACGACGTAGGCGTAATCCACGTAACC  
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10 CGTCTTCGGGTCGATGTCGTCTAACTGGCCTAGCGTCTTCCCATTCACGATCGG  
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15 CGGTGTTCTTCACCGACATAAGCTGCAACCTTCATCATAAATGGCATTAGACTC  
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20 TGCCGGATTTGCGGAATACCTGAGACCGTTGACGGAGTAGAACTGGACGAAAG  
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TCTGCGATGAAGTAGTAGCGCTGACTGTGGACACCGGTGCGCTCCACCCGGAG  
25 GCCTGGCGGAGGATAATCCTGGCTCGGAGGATGTCTGGTATAGAGTGGGAAAT  
CATCGGCGACCAAAAAGCCGTTCTTGAAGTTGTTTGAAGAGAGATTGACCCGAG  
CCGAGTCACCGTGTGGACCATGCTCACGTATGATCACGCGAAGATACGAACGG  
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CGGGACGTACCTGTGGTCCCCAAGGACCCACCGGTGATTAGAGCGATGTGTG  
30 GAATGACGGAAAACGAGCGCCGGGAAATCGTGAAGAAGAGTTCGGACTGACT  
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35 AAGCTTAAACAGATGTTACAGAAGGTTATCAACAAGATATCAAATTCGGATCTT  
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CTGTTGCAACGAAGATTTTACAGTTGTCTAATACCGATGTGAGAGGACTTCATAT  
AACACATAGATGGATGTGGTTCACGCCGGAGATTGAAATCAAACGAATATCTAA  
40 AATGCTCGGGATTAAGATAGACGTTGTTGATATAACTGATGAGTTAAGGCGTAG  
ACTTCGAGGTGCTAAAGGCAAATCTGTGTGTAAAATATGCAAGAAGATTATGTTG  
GAGATAGCTGTTAGTAAGGCCAGTGTTGTGGCCACGGGAGAATGTGGTATGGA  
CACCATAGCGGGTGCCGTTTTTGGACGTGTGAGGCGAACC GGATCGAACCG  
GAGTTCGTCCAGTTGCCCAAGAGGTA CTTCACGGAGACGATCGCATCATCGT  
45 GCGGCCGCTGATCCGCATCCACGAGAGCGACGTGAAGAGGCTCGCCAGGCTT  
CTAGGTGTGAAAGTACGACGGGTGCGGGAGACCGGGGATCTCCGTAGGGGAC  
GCCGTGAAGGGTGTCCGCTCCAACACCTGGACCCGTGGGTGGACGTTACCGAT  
GAGCTGATGGACGAAGTCTGGGACGTCAACGTAGAGGCGTTACTCGTAGCCAG  
GAGGTTAGGGCGTCGGGTATCCGTGAAGTGGCCATCGTTCAGGATCATATTGG  
50 AAGGAAGTCCCGAAGAGCGACGTACGTTGCGGAGTGTGTCTGGTACAGGTGG  
GTTTCGAGCTGGAAGACCCCGCCGGTACAGGTAGAGTCCTATCGTGGCTATCAA  
CGTTACCGCGACTATCAGCGCCGCCACCGATCCCCAGCCTGAGACTACGGGTT



CCGGTCTCTCACGCTCCATGACCCTGGCCGACTCTGAAGGGTGTTTCGTGCGAT  
TTCTTTCCGGTTTTCTCAGAGGAGGGACTGGCGGTCCTCGTCCCACCCACGGT  
GGTTCTTGAAACCTCTCCTTCGGTGCCGGATGCTACCCCAACGGACGACTTCC  
GCGCGGTGGTCACTGATGTCGCCGTCGAGCCGCGACCGTACCCGCCCGCACC  
5 GGTGTTCCGGAGTACCTCCACCCGCAGCGACTCGTCTGGATACATGGGCCGTGG  
TAGACCTCGACGTGGAGTACCCCGCAGGATGTTCTTGACGACTGTGGTCGCA  
CCACCACGAGGGTGTTCCGGTCTCGGATCGCGTCACGGTTCCTCCCGGAAGTCCT  
TCCGGAAGGTTGTCTAGGTTCCGTCG

## Attachment B

&lt;SEQ ID No.:0001;PRT;Methanopyrus kandleri&gt;

5 MSLEIDGSYGE GGGQILRTAVGMSALTGEPVRIYNIRANRPRPGLSHQHLHAVKAV  
AEICDAECEGLEIGSTEIVFEPGKVKGGGEYEV DIGTAGSVTLLLQAVKLAAIAADGPV  
EMEVRRGGTDVKWSPPDY EINVNAHYLDRLGYRYELEVLRRGHYPRGGGIVRARM  
EPPKRLKPLEAVKFGELSVRGISHCVRLPPHVAERQAKAASEIIERELGIRPEIEIET  
10 YPKGRDPHLGP GSGIVLWAEDDQGNRIGADALGEK GKPAE VVGREAAEQLVQRLR  
TGMALDEHMGDQILPFLAIADGESVFGVTGVDPHLPTNAWVVEKFLPVSV EIRGKE  
GEPATVEVRPEG

&lt;SEQ ID No.:0002;PRT;Methanopyrus kandleri&gt;

15 VGVIEDMMKVG MRSAKAGLEATEELIKLFREDGRLVGSILKEMEPEEITELLEGASS  
QLIRMIRSLHTPAVDVFERSGEFVIVAEVPGARPEDVQVRAGERFVEITANIPKMRE  
GEAKTRERTVGEVRRRIDLPEKINPSAVSAKCGRGLLIVRAPKAEASEIEVKPMEEE

&lt;SEQ ID No.:0003;PRT;Methanopyrus kandleri&gt;

20 VSGNPFRKMPEVPDPEELIDVAFRRRAERAAEGTRKSFYGT RTPPEVRARSIEIARVN  
TACQLVQDRLWEIVRKTPNLDELHPFYRELADALAGIDRLKSSLADVHTVAKIARLIR  
EEYTRKIKRARDPRTAAELRRQAFGRLASTIRRKVG DALRFLRKVQPKLVDLPAIDT  
EMFTVTLAGFPNVGKTTLMTVLTGSRPEIAPYPFTTKGIQVGYMERPYPVQMLDTP  
GLLERPEEERNPVERQAIAALKHVTDAVLFLIDPTGT CGYPVEEQLELLDRVRKEFD  
25 VPVYVVLTKADLRDLWEEPDLGEPVYKVSATERTGLKELRELLNDLARGHYSGRD  
RGHDEGRDEER

&lt;SEQ ID No.:0004;PRT;Methanopyrus kandleri&gt;

30 MEYIYAALLLHAAGQEINEDNLRKVLEAAGVDVDDARLKATVAALEEVDIDEAIEEAA  
VPAAAPAAAAPAE EEEEEEEAE EEEEEEEEEEEEEAE EEEAAAGLGALFG

&lt;SEQ ID No.:0005;PRT;Methanopyrus kandleri&gt;

35 LVPWVEKYRPRSLKELVNQDEAKKELAAWANEWARGSIPEPRAVLLHGP PGTGKT  
SAAYALAHDFGWDVIELNASDKRTRNVIEKIVGGASTSRSLLRMTREAGGDYEHVE  
GHSDRVLVLVDEVDGIDPREDRGGVTALTRAVRQARNPMVLVANDPWVLPKSLRD  
AVRMIEFRRLRVNDIVEALRRICEREGIEYEEVALRRIAKRARGDLRAAINDLEALARP  
TGRVTSDDVEALGWRDKEITIFEALGRIFNKPPRQARRALWNLDEDPDDVILWIAQN  
IPRAYRDPEE IARAYDYLKADV FSSRAIETGDWRFKYVYATDLMTSGVAAARKGKP  
PGFVRFQPPKILRKLGTTTRKEREVRNSIAKKIAERMHVSTRRAKMDVISVLEIAFRKV  
ADNPTDRGLEILGGIAGYLELSKREIGFLCGDPQVAQRVYQRALRVREKL RKIRRER  
40 VKGAMESMLERKREESEVEEEAKEIEEAVEKAEEEEEREKKKEGGGEQRTLDAFF

&lt;SEQ ID No.:0006;PRT;Methanopyrus kandleri&gt;

45 MAEHEL RVLEIPWVEKYRPKRLDDIVDQEHVVERLKAYVNRGDMPNLLFAGPPGTG  
KTTAALCLARELFGEHWRDNFLELNASVSADTPILVRRGGEVLRVTFEDLDSWYFG  
DRGGEYVDVSDLEVLTVDNRNFRVTWARVSKLIRHRARKILRVHLEDGTIELTGNHAV  
MVLDEGGLRAVKASEIEEGSFLLSFVAELDEQPTDGGTVVTSVSGSGSRVSDTTYEL  
PVEVRVELLRELADDGVIEASEDVSDLAWLARISGVESRVTDGVELWETRTGD  
LLPADPV LKLVERLES DLVDDLESWVFDGRVSKEAVRKVLSSVD AKNLRGDARRAY  
RMLRTLVRSDVHAVKVEDLDVMDYDGYVYDVSVPGNEMFFAGEVPVLLHNSDERG  
50 IDVIRTKVKNFARTRPMGGARFKIIFLDEADNLTRDSQQALRRIMEMYS DACRFILAA  
NYSSAIIDPIQSRCVVKFTKLPESA IKERLRKIAESEGVEITEDALDAIVYVSEGDMR  
RAINVLQAAAAALGREIDEDTVFQIAATARPEEVREMIHHAWNGDFERARELLHELLT

RYGMSGEDVVRQVHREIFDMDEIPEEAIPELVNAVGDFFEYRLIRGSDERIQLEALLA  
RIHALGNEYS GG

<SEQ ID No.:0007;PRT;Methanopyrus kandleri>

5 LVEIKEIGEVS TEETSPGAHSHITGLGLDENLKAKPVG DGLVGQEEAREAA GIVVEM  
VKQGRRAGHGLLLVGPPGTGKTAIAYG IARELGEDVPFVSISGSEIYG TNL SKTEFL  
QQAIRRAIGVEFTETREVIEGKVESLEIERAKHPLSPYMEVPSGAI IELKTQDDHRRF  
KVPEEIAIQLVQAGVREGDVIQIDVESGHVTKLGRAKDALEEEEEELLGVH AVELPE  
10 GPVQKKKEIKRVVTLHDLDMANVRAGRL LGFREEITDEIRQKVDERVQKMVDEGE  
ASLVPGVLFIDEAHMLDIEAF AFLNRSLEEEIAPILVMATN RAMAKVRGTDEEAPHGI  
PGDLLDRMLIARTRPFERHEIHEIIGIRARVQDIQLTDEAHEYLTDLGEEKSIRYATRLL  
EPARIVAEKEGSEVVEKKHVERVEEVFTDVS DSVEYMERMRREL PVMKYLTG

<SEQ ID No.:0008;PRT;Methanopyrus kandleri>

15 MGTPEGIDVITV VISEAPYGQERAYTALRFALTALVEGEEVKIFLIEDGVFLGKKGQN  
PDEVPNYLELLEQCIEQGA EVKACGPCSKARGLSEEDFIEGVELATM HDLVNWWVKE  
SDNVIFF

<SEQ ID No.:0009;PRT;Methanopyrus kandleri>

20 VYVATWTGPGLD TDPNPETNCWTT SVWDVKWWNSHLDEV PVKEQIELIPVKDISR  
WRRILYTGVD PVTGHRIDV VYPGGWRPEEHWGSDWDDL RWAQLHLGIGYVGIC  
AGATT FIRAFCVWSVDGLKGHALPEVLL PHPANPLVQEGESRVIRMY YANGPGM  
EWKRGWYTIKYIDKKLHKIKAYCDVQGV MKYLEHVKGWAYV VAGR WIVDGV EKGGR  
25 FVMSVHPEIMGRKDKDPDMVQTFIYAILWAAKRLPSGWKIHLTLDKTLVGVGEAVK  
VVLRLVNSVGAPIADFSPIWVKVVGPEGEEHV LKTNEEGKATLT VVPESEGLYRIE  
ASAVDVQATGSFSVGIPPVPFPVVTGVLIAAILGIVVTPRRVRQSSQG

<SEQ ID No.:0010;PRT;Methanopyrus kandleri>

30 VEPDELIEELELRKRPRGTVLLCGIGRLGFRVFLRLLETHRG GPKRIVCVDGQRVEP  
DDIIHLRHGARIGENKA EFAARLGRVHPLREVHAEPEFVTEENASELVDTWEPDVVV  
ITIAGGR TTPVTAALAREARRFGAVTVSTGGVFGYGSEEV RVVQLEEAEGPVAREL  
REYGAPSDHVLVTTGRYIRD PDPIPPMVLERVADELTELALRALSNPSRGDDDS

<SEQ ID No.:0011;PRT;Methanopyrus kandleri>

35 MTVAKAIFIKCGNLGTSMMDMLLDERADREDVEFRVVGTSVKMDPECVEAAVEM  
ALDIAEDFEPDFIVYGGPNPAAPGPSKAREMLADSEYPAVIIGDAPGLKV KDEMEEQ  
GLGYILVKPDAMLGARREFLD PVEMAIYNADLMKVLAATGVFRV VQEAFDELIEKAK  
EDEISENDLPKLVIDRNTLLEREEFENPYAMVKAMAAL EIAENVADVSVEGCFVEQD  
40 KERYVPIVASAHEMMRKA AELADEARELEKSND AVLRTPHAPDGKVL SKRKFMEDP  
E

<SEQ ID No.:0012;PRT;Methanopyrus kandleri>

45 VLRVATAECFTHG FVGREIHASASGYTGELGSEILGTELEGKVS VVAACFIPTV SGL  
RSLLGIDPPEPDEVSKSGAKAYREETDRKVAVMMARAVRERTGADV GIGTTAGIGR  
GAICLDDGEITLLGR TDVHANLLKPDERIRKRQLQG IKRSLVMFRAYFRCELDELLEE  
EWVEEVTRDLP

<SEQ ID No.:0013;PRT;Methanopyrus kandleri>

50 MVEINKVAILGAGCWRTHAATGITT FKRACEVADETGIKEAAL THSSVTYAVELKHLA  
GVDEVVLSDPVFDADGFTVVDIEEDCDVDLDEFIKAHLEGNPEDVM PKLRDYVNDIA  
DDVPKPPKGAIHFLSPEEMEDKLDIVTTDDAEAVEDADMIISWLPKGGVQPDIFKKII  
DDIPEGCIVANTCTIPTRQFKEMFEDMGRDDLQVTSYHPATVPEHKGQVFVAEGYA

DEEVVEAVYELGEKARGLAFKVPGYLLGPVCDMASAVTAIVYAGLLTFRDACTDILG  
APVDFTQNMAVEALQMMMAKFMEEEGLDKLEEALDPAALTNTADSMNFGPLADTEIL  
PKALEVLEKYSKKA

5 <SEQ ID No.:0014;PRT;Methanopyrus kandleri>  
LKEPEPGITDLTETVRSRPFWDVVKEIGLAKAEIEAEVVPEGSRILVLGAYLTGIFVAE  
LLSEEHEITVLDPEPALRKILPPGVRFRASRVPPPGRYDVVIDLTGLGGTNPRVLRRL  
NPEVLVVENPAGNMNDPRIEEYNDTEERLEAGEESYELRLFDAPFEAKTSGTFTLS  
VRTVREAANRLERHYGVLYAVPGVVNLERWTFRLRRPEEGVERAREKPAVTVSQL  
10 TGSSDPDEVIGEVLDEILFEIRER

<SEQ ID No.:0015;PRT;Methanopyrus kandleri>  
MRSSSKSVSVEGVLEVLEGLAPFDLAVEGDEVGLVAGDPSDSVDRVVVCLDLTPQL  
VRRLSPETLVISHHPVPGPLLERVRSPVIVFHSNWDAAARAAEALAEWLGLDVRKP  
15 DPLAAEGRFDGTLEDLLSRVEDALNPPEIRVVATKNRIHRVIVVSGFGLSTDRFVRLA  
AKEGADAVVSGDLTHRTAVVARVLGVTCVDATHARTELPGLKELAEELSKRLRVV  
ELRSPEHPVGDHYRAFQRRARSQDGS

<SEQ ID No.:0016;PRT;Methanopyrus kandleri>  
20 VRFKDALREVTRDRKLADTEAIVRLLSAKSVRVHDLFRAALSEKLHHRGELVKLTSTI  
HVTNECRIRPRCAYCGFAAGASPEGYFEGFTRSYEEIAEAAKAIEESGIPRVSCSGA  
YRGDGGKLAVTAARAVKENTDLELLINFGHDLSEETIAELARLDVETICCNLETTNRE  
LFERLKPGDSFEERVRCETVCRYGIDLSSGLLVGIGEDYRDRAEHLKFLARFETLA  
EIPIMGFNPYPGTLMEHVPRCPLEQAKVMAVARLMYPDLMITAPTPTVGPEEVEVA  
25 LMAGADNLATVIPDNHPHEVKGVGNPRTGNLDRVVELIEGFGLKPELRGDRACSTS  
CTKLVNRSTQRSS

<SEQ ID No.:0017;PRT;Methanopyrus kandleri>  
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30 CDLIELAVGPCASDYSPDVLLANAILADRMGLPLHVCAYAVADVAENYGMRIELFR  
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RQQGEDLEEWAEALAASICVNVTEGEGQDAEHAAPLDEMKRVAETARHSGAGVG  
AILHVADGEDEFADGLKAAVEEVKADYLAVEGGPFNRAEDRLSAFRRAVVACRVFA  
PGKVLTNGAYEDLVGLRAGLNGALSGFPKNHHGYMVGYPEGTARRGKFGLPK  
35 VLAIMRKTGLSRYGNTKVPAGWEELEGITRAALFLGSNLLYPRDVAGIPIGDVHWVA  
ALRSNAARELSDEVRSVEEVASEVDADTVALLGGRFPWGLALTDELGVSEVLISD  
PDAWVERATVRLLDEELDATVHAMAGDDRKAVKEADAAFTAVMPGIAERLAERT  
GAMTV

40 <SEQ ID No.:0018;PRT;Methanopyrus kandleri>  
VLKETLLKAWWESWEGTRRGDEEREVEGLREYLTSADRLAVVTGNEDKLRAVNKV  
LRRFGLPEAMIRVPTMADATPCPAIFKAIMGVQVSDADVVIARGRLGVPGSGAM  
TVFMDARCRLTAALSPPHVLHEMSVKEAMEREAEALRRLGMRETTSR

45 <SEQ ID No.:0019;PRT;Methanopyrus kandleri>  
VFSVPSPGDPALTDRLRLSLPTDRIETVYFGLPIAGTGRATPVQVDTDTATELAEVC  
HSYSVEPEAVINPLCTADVCSRNAFAEFERTLDDLDAGIERLVLSPLMIHAAVE  
RGFRVSVSCVVEVNTPERARYFDEIGVEEITLDTNVNRRLDITIEAIASEVSARLRIIVN  
EGCLPDCPYRASHFCLFSHATRPGEVAEDPYFVRCISERVNNPTLIKSPFVRPED  
50 LSVYMDLGVRFAFKIAGRANSITWIRRAVRAYLRGRYDGNLLDILDCPTVLRHLYHVD  
NRELDGFLKRVGRCDRRCSKCGFCAELAERAWEPLGGLEDAEVEPARTGRVTA

- <SEQ ID No.:0020;PRT;Methanopyrus kandleri>  
MPKLNQRGLVELRRELERRLVELLGKPVHVMQLTIFALPCGCVGASLEVRNIVREDA  
EVFRDHLRDLLREMVKWTLGKEPDLYYARLTPSGYDVVSLTGRVACDECEKNFKG  
AADVLPL
- 5 <SEQ ID No.:0021;PRT;Methanopyrus kandleri>  
MTEVGVIGGTGFQPGLPERRRTVFTPYGTVRVDITRVGDHRVYFINRHGKGHDLP  
HRINYRAIWAMRELGVKRILATNSVGVINSDEYEPGDIVLPVDFLDFTKRRPTTFYD  
EKVVHVDVTEPYCPELREALLKAADDLGTVKEGAVYVATEGPRFETPAEIRAFRKL  
10 GGDIVGMTGFPEVVLARELEICYASVCLCTNYAAGIDRRRTIDEVFELVEELRPKAV  
ELIERCIEYIPPKRSCPCSQALEGAEV
- <SEQ ID No.:0022;PRT;Methanopyrus kandleri>  
VFSISVVITIGGLPGSGTTTTMARRLAEHYGLKHVYAGKIFREMAEERGMDLEEFKSV  
15 AEDNPIDLEIDRRQREAAEEGDVILEGRLA AFVAAGELDHVKGPDLATLKIWLKAPL  
EVRAERVAKREGIDVEEARRIQEREKSELKRYKEIYGVDPTDLSLYDLVLDTSRWS  
EDETFSILKAAIDPLLEREDP
- <SEQ ID No.:0023;PRT;Methanopyrus kandleri>  
20 MPAPRYRSRSCRRVYKRTPGGRTVIHFEEKIPNWPCKGACGRRLNGVMRGRNVE  
LKNAPKTQKRPNRPYGGVLCPECARKLIKDKVRYKFWERKREQPWLPLPDEEPP  
EPEE
- <SEQ ID No.:0024;PRT;Methanopyrus kandleri>  
25 VHGLTEGLARHFYPLVDPFIHYFGPALGMLVAAALVTLFIDIVYELVIGREELERV  
MADETKKYQEELQRAKVLGDVKRMKEIEEKMRDHSREFLKVQSQLMSKQIKAMIITF  
PPIIIITYLEYRLAHWTVKLPFYVPGVGD TLGPVGWYILCAVTVSFVLKPLAETAVKRF  
GGG
- <SEQ ID No.:0025;PRT;Methanopyrus kandleri>  
30 MGYVIVATGVPVGATTVTTEAVKELEGYEHVNYGDVMLEIAKEEGLVEHRDEIRKL  
PAEKQREIQR LAARRIAKMAEEKEGIIVDTHTCTIKTPAGYLPGLPIWVLEELQPDVIVLI  
EADPDEIMMRRVKDSEERQRDYDRAHEIEEHQKMNRMAAMAYAALTGATVKIENH  
DDRLEEAVREFVETVRSL
- 35 <SEQ ID No.:0026;PRT;Methanopyrus kandleri>  
LADDWLERLRPILERLPEVKVPDRHVPFNEKLFKYTGIPILIFYFILCEIPLYGLSPQAV  
DYFANLRAVLAGNFGSILTLGIGPIVTASILLQLLVGGDLIKLDLTNPEDRRLFQGLQK  
LLAIVLCFFEGVMMVFSGAAPPAEPSILLEILLILQLALGGILVIFLDEVVSKWGIGSGV  
40 GLFIVAGVSSQIIIGAFNPLPSPQQPGRPAGAVWAFLYSAMQGTDPDWTLAPVIGAI  
TFLIVLYVEGMRVEIPAFAGIRGARGRFPVRLLYTSNIPVILASALFMNVRLWALAFQ  
RMGVPILGKLDPRGQPISGLVYYLSPPNSIVKTLSDPLQALGYMMAMVIASVFFAVL  
WVELTGMGPRIARHLHRAGLHIPGFRRDIRVLEKRLQKYIYPVTVMGGAFVGFLAA  
GADLMGALGGGTGVLLTVSILYNMYEEIKQERLMEAHVPVRKFLEKTLR
- 45 <SEQ ID No.:0027;PRT;Methanopyrus kandleri>  
VVVRRKKKSPKKYRGSRTHGGGSHKNRRGAGNRGGRGMAGSHKHKWFHVIKYM  
PDHFGKRGFNRPPKVREPNNTINV GELDADLKDLEDGIAEKDGDKIVIDVTDERLK  
PYGGPFDKVLGGGHVKRPLVVVAPEFTERAVEKLEEAGGEAREA
- 50 <SEQ ID No.:0028;PRT;Methanopyrus kandleri>

VRGPVGVRRDIEDTMRMLKLLRRNWCVLIDDRPSYLGMLQKIKDYVTWGEVEPDT  
VAALLKKRGELEGGRPVTDEYVSEHTEYDSVEEFARAYCEFEALDDIPKLKPPFRL  
HPPRGGYERGGIKPYTLGGALGYRGKAINDLLERMI

5 <SEQ ID No.:0029;PRT;Methanopyrus kandleri>  
MSVPPHLEEWEPKTKLGRMVKEGEIKTIDEVFAQGWKILEPEIVDWLLPDLEEEVLD  
VNMVQKMHKSGRRVRFRVTVVGNKDGFGVGVGQKAREVGPAIRAAIDRAKLNIIK  
VRRGCGSWECGCGRPHSIPFEITGKCGSVRITLKPAPRGTGLVAGETAQKVLEMA  
GIEDVWTKTTGGKGKGETRTTINFAKATFDALRNLIYVRMREEEAERLGIVSGSAEG  
10 A

<SEQ ID No.:0030;PRT;Methanopyrus kandleri>  
VIALATGPRYRVPFRRRREGKTNYYKRRELKADAPRLVARKTLNHNIAQIVDFAPH  
GDVTLASAHSIELRNKFGWKHCGNTPAAYLTGYLCGLRALERGIERAVIDIGLHRP  
15 VRGSRVFAMLKALDAGMDIPHGEEVLPEDRIRGEHIANLARQIKEEDPEEYERRF  
SKYLERGLKPEELPEHFEEVKSKEIEEFGGA

<SEQ ID No.:0031;PRT;Methanopyrus kandleri>  
MNLRPQRRMAAEILKCGVHRIWIDPERLEEVARAQTREDIRRLIKEGAIRKKPIKGQS  
20 RVRARKRHEQRKKGRQGRGPRRKGAKGARMPKKRAWIQIRPIRRKLRELDSG  
KIDRSTYRKLYMMAKGGYFRDTSHELLAYIEENDLWKK

<SEQ ID No.:0032;PRT;Methanopyrus kandleri>  
MKYKMELSDLECPVCGEKALMVHGRVDEIPHFGRVLEQFIHCKACGYRHSDVMCL  
25 EDREPAEYRYRVNSPEDLRVRVVRSPSGFVEIPELGIEVKPGPAAQGFVSNIEGLLR  
RIRERVETAAKWADKEESKKRAEEILRMDAAVSGEDEITIVLKDPYGHSAIVPEED  
DKLEVRELDEEEAEELRSRIFRPLVPSGEYSN

<SEQ ID No.:0033;PRT;Methanopyrus kandleri>  
30 MARSTIVLIGGASGVGTSTIAREVARRLNITHLIETDHLREVLRGAIKKYAPVLHMSS  
YNAYRALRIPDH MVPKRFRDRVIAGFVEHASMVKPAIDMVIKRAVEDASDLVIEGVH  
LVPGLVRPEDYQYADVHMVILYADEEEHRRERFVKRAMEKGRGGRHLEYFRQIRIHH  
DFLLEAADEHGIPTIKNDIDRTVSEVLSVVRSVSVIKSVHSLEDSVREAEIIRENNC  
RLIDIGFPIPGKRDVIKVSFRRDPVDEWEEILNNEESRQYFKHLYSASNNVHYHKISA  
35 PDEESLHRAIEKLREEGFKVEELRPGDVCEVGKEDRGG

<SEQ ID No.:0034;PRT;Methanopyrus kandleri>  
MLGFLKKIFGEGENSKGPMLEDFLEEEEEERTQHVKVTIIVSRVQEPSDLEELMNEL  
40 YQGNVLILDVKPLLD RDGHEDIQELKRTAVSLGGFVGVIKDTVLLVTSDSVDIERRG

<SEQ ID No.:0035;PRT;Methanopyrus kandleri>  
LTVLRSIDELAE LNPFVVGAGGGGGEKFATLPTVEVVGIMDDDP SKVGMEIAGVKVT  
NDFDEAVEGASSVAIMLPKGAEHRALELAVESIRRG LNVVTSFRSLPLEDYPALVKL  
AESKGVKILELSPRLDVREVAGDAPERCTEVVPKDRPETEIPRVFVGGTSQECG  
45 KRTTTLKLAEGLEASGYTPATVATGEFAALEADVGFAGSLSVMDVASAVAHAVDY  
VAEEKDADVIIIEGQSSLTERRNPHRPLYLGILLGCAPDAVVVCHRPNHFPFRYPRG  
VLAEVNALRVIVPDADLA AVCVNPRNLEEPFETYARRLR AKIWRATGEQVPVRNPV  
EESEKLARDVLR TIEGAGRGGARC

50 <SEQ ID No.:0036;PRT;Methanopyrus kandleri>  
MKETS VKEVPELDSRAFRIAVLGPENAGKSTLVNALMGREVTEVSEVPGTTKTVSG  
YRWTSREFPLYVFDTVGLADERGKRSKRGVRAEDVAEKLGRYDLALFVVDVTRHV



GPETLRALHVIKYAADLETLLVANKIDLLDRGELEERLERIRERTGHRPIPVSA LTGEG  
IGRLLREIERRVREKRRTLRAAPGYR

<SEQ ID No.:0037;PRT;Methanopyrus kandleri>

5 LDVEAVYRLKRILRTGWLVRGIPRSSVESVAEHSFGAAMLAW EICHRLAERGIDVDP  
YKTVVMALIHDLPEALTLDLDVEASRVFGDAKREAE EKAECVFDEELDLWREFER  
RESPEAKAAKLADTLDMALQALEYSQVGFEAYREFLDSAEREARELGREYLLVFKEI  
LRERGWDSNEGGGKGS

10 <SEQ ID No.:0038;PRT;Methanopyrus kandleri>

MKVVEKDLDKGYIEVLPETLDDLWHLYHVVRKGD LVFALERRRVKDERAETIRRD  
GERKPVYLGVRVEDVEFDKYANRLRIKGVIEHGPESGSHHTVNVTTGKRIKIVKDEW  
ERKDLERIEEAEMSRPPVMLVAVD TGEGTIGIVRDYGLDVVARVRHNVP GKRGD  
RAEMRKFFHRLADEIERIAEEEGVEHIVVGGPGFVKSDFAEFLREERDIPAHVEDTG  
15 SAGEAGLIEMIRRGAVERA VEESRVAEEVKHLEEVFKRIGKGDDKVAYGVRECLKA  
AEFGAIDVLLVADEK FREAMVEGEEDVLNAVKYAERTGAEVLIVSTEHEWGERLREL  
GGIAALLRFSIPTG

<SEQ ID No.:0039;PRT;Methanopyrus kandleri>

20 MAVERVSTGIPGMDEV LNGGIPERNAVLLTGGPGTGKTIFSQQFIWAGLEEGEPGV  
FVTLEEHPVQVRKNVEGFGWNFREYEEEGLLAVVDAFTGGIGRASEYEKYVVKDPT  
DASELIGVIRQAVNDVEAKRVAIDSVTPLYIDKPSVARRIMFRLKRMLAGLGCT SILVN  
QIAAHERGFGGPGVEHAVDGIIRLDLDEVEGRLWRS LIVWKMRGTAHSMRRHPFEI  
TDEGIRVDPEKV FVKERGEVREVED

25

<SEQ ID No.:0040;PRT;Methanopyrus kandleri>

LGGLCPRCRGRGWCGRDRCPFLDALNEVRARLSSRNVDGYTVTAHVS WRGYPRV  
IAAPGVGEHRTPEDEGGVLADLPYEEALKTRALTFRRYRGKR DVARNPPDLSDPEIES  
SISVRPVESTLQVRRRLSGASRTTFFIGPLVEGELELDGTPKVPRDLERYHEDDVKA  
30 EEAVVGLYRRGYDESYIARALSLGLGRDRRMVPTRWSVA AVDSMVSEHLAREVR  
DLPVSSEYRVLSGEVFGNEMWVILRPEPLSYELVEAYEPGAPWSDRTRIAVLRDSE  
VKDCKEPRETG GAYFAARLAALEWCSELGKQHGITVIRIVRKEYSAPLGAWVIREAV  
RRAEEVFSTDDPREVWEFLREKLD DPVGEEALKVIKRGRQRTLD TFL

35 <SEQ ID No.:0041;PRT;Methanopyrus kandleri>

MLLLKDHAEVLLTVEELGTREEAREIAEEAEAVTEIIPQRLL ELELQGLMKRVGPNEW  
ELTDAGKTAAKAVAEAVDILEQPPQEWAHDRWVGS DTVLALKHAALS FVPERWEE  
LLSERGLSEDGELTKAGELVLEAYFKATPKLYVTQDVAGRIARLPPGPGTLKTFIRYR  
ETIDIPDNIFHALEAMRLLVISPPADGGRTYT LTALGREVKYAIEKAIPAMHLVLS PGIM  
40 EDVKAVSEGEPEMERLERLGYAWKGS LTRAGEHVL RAYEMVGEDFPGVPPISI  
RPSELRLLEIIDHLYRPDENPNVAPTLKRIKRVLVEEYGEADPDPTTDLKELEAHGFV  
EKTVC DYGKEKGKPIWVLTEEGERLLHGLGAPVRAEGVKAVTVSMGFESP SPEWL  
EEAHRAGLV SQAAITTKGLMAAKIARRVERAPFLT GDEAKLIYRMPNGSIDRGK LIED  
VCDRYGLEEHQVLESLSKLESRGIVEELLTGGVILTRAGQHLKTAIHRGQTMEILKLR  
45 HPITPVATRLLKAVYDLKREGVS AKKLSKFPKTL LKRA DVTLDQAKKAVG LLRRTKM  
MSGWKITEAGEELLRAFEVLQEAP EVRQHP EEA

<SEQ ID No.:0042;PRT;Methanopyrus kandleri>

50 MRALALLALVLA AVGGAAAE EAPLYGVLTHPWTFQLS ANQAKQIPKEYVISVEAPAG  
AQLPLGKAYYG VVADGNHAALIVDLTPAVTGETDDAVV VDPNAMSGKLPPAVKFR  
QWKPAHLAKGALLALSLETKPLPVGLSLKMVAPEELTIEVGKFQV KLNRELLEGLAR  
VLATHEYGHPHGKKKTPVGYLQALVFKYFVKASVTGAEPEELQKLEVSEEEKEGEE

EKEVDEETGYALRAFLEVNEQQGLTDLKAEFSVDNLENLIGEAVTVLQDVLSSPEAQ  
QAAATAESALKKFVQVPVAAVCLLGIALVAVRRR

<SEQ ID No.:0043;PRT;Methanopyrus kandleri>

5 VKVSEIVSMLARILAEHYRSGVSLKESFYRALDNPFSIPSHRARAIHRRLMELGKRLG  
LCEEILDDVIQSGSFEDLGPELKGVLVTAADEMLFEGTSPALVTDAAATRVAKELVSD  
RVADVFHAVCFDLEKYDVDRLKRRGYDDLCLRHYPDFVDYVRRVLPEDIEIDFL  
RACNKPAVKYVRVNTLRADVDEVRERLAEEGVLTEPDEHIPDLLRVVEEIIPIVRTEA  
WKEGLVFTQDKASAAVAHVLDPQPGFVVDLCAAPGGKTLHALCLMEGEGEILAVD  
10 KSDWRLDAMREKLAWQRPVDPGVVELRCADAREIPEELDEEADRAIVDPPCSGMGS  
VQKRPEPTRWNVTKKRVRRYAKLQSELLEAAIKTVRPGGIVVYSTCTLTINENENVIR  
RVARRYDVTIEKVNLQFGRRGLVPGTRRFYPHTDRCQGFFIAKLKRN

<SEQ ID No.:0044;PRT;Methanopyrus kandleri>

15 LYEDGEKFAAFGAYYRREKGCKVMKAAVDAGFVCPNKDGRISREGCLFCPKMGRT  
IITPNVDPRKKLEEQARKQMEVFRERYGAEKFLVYFYPATNTYAPPDVLEELYNRAL  
EMEDVVGLSIGTRPDCLPDEVLDILEGYVKEGYDWWLEIGVQSYHHRTLRRTRRGH  
GLAEVIDAITRAKERGIRIVNHIIFGLPGETRDEMLETVRVLSVLGVEAVKLYPLVVLE  
RTDLERMYDDRRYKPLSYREYIRLLADALERMAPTCLIQLSKDRAPDEERIEPEWD  
20 LYRMRVISDVRKELARRESRQGELYKVGLSAEELVPLVKGATGAERSGVST

<SEQ ID No.:0045;PRT;Methanopyrus kandleri>

MPPKWYRHVMRVLSESHVVLEVRDVRYPEETRWKLPRLLEDVDFTRVWVLNKAD  
LVPRAETERVKEEVELEEDVPAVYVSARERMGFRHLRRTIYEVAPEDVETVRVG  
25 GFQNVGKSTIINALTRRSAAETSRAGYTRGKQWVRGGRKLLVIDSPGVIPTDEAAA  
EVALDPDVLDPVEPALGVIERVVREYPGALSDKFGIDESMDPERILRDISERLGKD  
LRTTAKLLLREWVDGSLVEIYRTTRADLAETSELEVGGTAQRLVEETLREIEEVPE  
GIPPSAATVRGILTRLAHGENVDGVGFGTIRLGEYGVGVSVGDRYYDRMVRRLRRE  
LGGEVISEERFRVGANGRKAVALVTKGR  
30

<SEQ ID No.:0046;PRT;Methanopyrus kandleri>

LIALVKSVEEYRRLLEGEVVEEGDVVVELGCHRGAAATRIILTGSPPRRVAVDYGKDAE  
EAMRELERSHPELTFVKGDAREYDTLKRVLLEELGGPECDVLAVDLGGGMFPDTAF  
KVYYVWSVTLRPRDAVVRNAGLCEFLKLAELREEVHLDDENRGYLGELSPPGIPGR  
35 IRERFEEFKLWRG

<SEQ ID No.:0047;PRT;Methanopyrus kandleri>

VFGRLVIPGGCRKVLVRVWGGRVKDLRNCKLCAWECGVDRLEGERGVCRVTEPVI  
AAKQLHPAPPASYTFMAGCNYRCLNCQNWDIAHYPDNPEGRALGYQDPKELAVE  
40 AVNMIETNQGRMIGADRIFFSGGEPTIHLPIEQVVEHYRDTTDLWKVNFDTNFAT  
RKSMRRIVKLADSITFDKAYSDDLHRAITGARVEPVLRLNLEFLIPKYLDKIWEVRILLI  
PKAHDTEEIRAMCEFLADLDESVPVCFLAFRPNFVLERHPGAPKRLMERAVEIAREC  
GLHATWSGMPGINGSVPPEVGECADKLLKHYDGRKGAALMGYARVTGCRNHPR  
DCLACDDMARCPIKRYVAIRRT  
45

<SEQ ID No.:0048;PRT;Methanopyrus kandleri>

LHWEGEKRRRLKELERAIERGEVDEAAIPVLETLSFEEYCTTSSCSGRVWVLHEPE  
VGDKIGSEFVAKWHEPPEPEEVREAVLKAPEEGITWVKAQPPLFHVCMCRDLEAAVR  
LRNIASEAGFKASSIRSVKSSKVIVEILGGERMDVPAKVNGLTLTREKAWDSVVALC  
50 NDILRSGHERLSRLVEALKGLSR

<SEQ ID No.:0049;PRT;Methanopyrus kandleri>

MVLKRAADMVPGKFRDLVEPILDDCADLEELADRVVETEMEPDEVRRRDVGNTDS  
NEPVAIFGSSCVLCGGDCSSVRLTSRIGICERCLPVDLTETLREVLKEARKRHGYVGE  
ALLMFILVERYSPDRVEEFFRRYVWPELFTIVDRVFDRTATGFRLYSAQRVWTRRLV  
KGCSFSILAPTGTGKTSWGSVAAVFGHAGRRVYLVPTTTLVRQVENRIKGFARD  
5 AELDVDVVAYHAAMPTQAKREALERISSGDFDVLITTAQFLVHRVEDLEKLNFDLILV  
DDVDAIIRGTGRNVDRVLRVAGLEQEEIDSAYRLATLRRRYSLRDWLRSLERDGD  
KRAERVREELREVEREIEELELLKRVKKERDLARIVFMSATGAAAPSRRLAVVREL  
FDFEVGAGGEGLRNIQDIAVISEPSPEAVERIVRKAGVKGGIFVPQRLPGEKKAREI  
VEELAHLRSSGIEARAIHAGTPAEEREEAIDGFSEGDVDVLVAVASPYGVIVRGLDL  
10 PQAARYAVFYGVPRQRIRLTPREEDLKDPTYVASALSNLARLLDDRRARSRLGVA  
GRLWRIIRGTWIRERLEEAVEPLSLNTLMKLAKRDPEDIAEQLDVDRWLARHVQTL  
AEGVRELTRLLGDPDRVKALAEAEATTVAVYEEGEEAYLEVPDLRTYIQASGRVSRIF  
AGGVTFGLSFVLCPEDERELRTLNLIRMSYTYGSEFEWRSYPKSLDMKEIGLEL  
KEISDEELEELVRKVDEDRERVRKVLGELKPEETGRLARSALMIVESPNKARMIAS  
15 LFSQRPSRRRLNNGGVAYEAAADGLHLTVATQGHVADLVEEPGVHGVLRIDERWV  
PMYDVLGRCSECGEQVVGSEECPNCGGEVELKTPLESIRELASEADVILIGTDPDT  
EGEKIGWDVFNLYLWTTAQVYRTEFHEVTRRGISEALKEESWKNVDAGRVSAILR  
RVADRWIGFSLSQDLWDVFKHLEIKLGELPSGSRIEVRDIPSGVEVVDFFRTFDED  
SSVRSRSVRLRREGDEYVVRTRISRGGDVITYATLLDPNRKLGDRNGVRPELVRV  
20 RASVNGEPVDPNVKLEPMTWLSAGRVQTPVLGWIIDRAREYRETEFYACRAEVA  
DDVTIRALIEELKVPRALTEKLDEATIRVLSKIAEEGPDAAFSEEEVGRFTETELFERK  
DGRYRLSEEGRKVLESEGVIGLMLHLAGVSGR

<SEQ ID No.:0050;PRT;Methanopyrus kandleri>  
25 VIRAIATVDENASYIAFVETPSANEKLLDVMMSREKWRELGMFVLDDHHGQLSEEPSAV  
AQAYEIVKEHTEFPLVRKVVEPPVDADMVAAVLLLKQGPVLPEEDVEVLDKIDRFKG  
HYPSEEELESAEYALAIMQAVAEEVVKKPYDPNPEELKETFKKALRTVERVVDDEKY  
REKLASKWLEEFKRKSVREAEESTEVEIEGEEVEVGNDRIRWCAAISEAQNAFTYLYRE  
GYDLVVLVSPVMKRVTVGLADPELPIDLRELFEYLNHHREGWGRKNIGGSPKNY  
30 EIDEEEFKDIVSFIHEWLLRFS

<SEQ ID No.:0051;PRT;Methanopyrus kandleri>  
LDVEEILRDVGVDPRYVAILDDTVVALNPRRAGLTVSRREELRREGIKVVRSKVVER  
ASSRFHQVTDYDLFEPREEVVVGFSGGKDSVTCLLMLEPLTRRLGLRIRPVLVETR  
35 LHGDPIWGREGREVCEEICRSLGFQLEYVEPREVDGELAEHGESPCLICSLIRRE  
LRERGDKLVLHTLDDAIVTAMASAIKGEGLNLRPVEELGGMRSEYVDYDFPETTIV  
RPMIRVPEVWTRLIPGEVGLPIFESDCPYSKPYGTTLRGKVAHGLEWLRLEVGADES  
VEFLDRLYRSFMKTLEATRG

<SEQ ID No.:0052;PRT;Methanopyrus kandleri>  
40 MSLTMLMFLNLVLAIVLSVGPDGIIIRPDVLYSYGLYLHNITVHPECLITYMFLHANLIH  
LLFNMLGLLTFGVQLERVLSTSEFLVLYLLSGLMGGLAQATLTPDVPVVGASAAIFGL  
LGCLTMLRPMMSMMMLFIPMPLALFAVLYAALALFVIQSGVVTQVAHAGHLVGMIVG  
GVLALLYRPSEALKGLLAVAAITALLAGYWFLTHP

<SEQ ID No.:0053;PRT;Methanopyrus kandleri>  
MAAESIAKAVHDVLATWGAQGPGAIFFLVWAAVLVVGMLGFMFLEAGQVVRTKNV  
VSVLMKNLLDLSLGGIVFIFFGFALAFPDYAQSIGKWIATMFTANPWSADPMKAADP  
YNLAYCFFQFAFCATAATIVSGAVAERINFKACLVMTVLITGLLYPIFVLWTWGGGW  
50 MGGDTGLFAKVFGQPYHDFAGSTVVAHIGGFLAMAAAYLLGPRIGRFKNGKPVPIPI  
GHNIPQAFLGALFLAITWYGFNVGSSAVLYDPTNESWISSLVATLAMCGGAAAAAFT  
TRFDPLWAANGLIAGLVAICAGCDIMSPFGALLTGIVAGLIKPAFRLLLEKLEIDDVAA

CPVHGFAGVWGAIAAGIFGAEALGGAGGVSLAAQIVGALVCIAWALGSGFATFYVID  
KVIGLRATEEEEEKGLDETEFGVSAYPYMETRD

<SEQ ID No.:0054;PRT;Methanopyrus kandleri>

5 MYMIEAVIRPEKLDDVKEALDEAGYPGMTVIHVKGGRGRQRGIVHRYRDEEYRTDLL  
DKILLKVAVPTEDDVEKVIDVICEHAKTGRPGDGMIFVIPLEDAVRARTGERGDDALS  
TEE

<SEQ ID No.:0055;PRT;Methanopyrus kandleri>

10 LLHADVLKVLKQGYGLVGKHSAPKCHWCREAIKNGRHCHYKAKFYGVESHRCLO  
MTPTVAWCQQRCVYCWRPVELTVGTHDVPDPPDPLIVEESVEQQRFLQGYGH  
LEGARKRWKESLEPRHAAISLAGEPTLYPRIGELIDAFHSHGFDTTFLVTNGLRPD  
RVEELEREPTQLYVSLDSPNEELHRQINRPTIPDSWDRIMRTLELLNSLSCRTVIRIT  
15 AIKGWNMEGTAEFGELLADVEPDYVEVKAFMCGWAAFRMSPDNMPSSHEEVRK  
FAAEIAEHAGFELVDESPPSRVALLSS

<SEQ ID No.:0056;PRT;Methanopyrus kandleri>

20 MPKRAGRVTIGLYNSYDPRRFHEIHARTIARAAPLCVAFDFKLALFGFPLDDLGVET  
PHELAEYVAEETTIGASGREVLVLAERNLLEVYDYPVRGFPQQLGTIVGTTCPDER  
KAIEPEDVVREILRPRSVTLVFGLGRRGLPAEVLEACEYHLDITGRRISLETATAIGAV  
TAVIGHLIKELGE

<SEQ ID No.:0057;PRT;Methanopyrus kandleri>

25 LKLREVKPEIRVLGIDGYYGPEDDRALVGVVMRGGQWIDGVMSTEVTVDGLDVT  
DRIAEMVNRSKHRPQLRVILTDGITFAGFNVLDIKKLHEETGLPVISVIKRRPDVASV  
SALSNDLTEERRKIVLRAGPVHVKTRRDEPPVYFQCAGVEPDVARVVLKRTATR  
HRLPEPIRVAHFIATGVTKGESSDA

<SEQ ID No.:0058;PRT;Methanopyrus kandleri>

30 VKLPEVEVVVKYDKDEVLLLELPGEDHTLCNLLRWALNRQDGIATYRIEHPILGKEH  
KVDEERYVPPKMRIRAVDEDADAREALERAIEELLEVEEAKEEFSGALEEKES

<SEQ ID No.:0059;PRT;Methanopyrus kandleri>

35 MPKMEKREITFTFPDRDSAQRFLRAVEATQARGVDTVVELRGTRVKVKVFGPHAAV  
KAHIRKLGELRRTVLSESEEEKQVRLHLSTICREAGAPKIPSELLRDALRRRGYRVR  
VRGPWITTNAPMSELREFVRELAAYREARFYAASEPVRRMLAILSHEYDVPMDL  
AYEAIERGVLREGEDGRCELREDPKSTERKLEEIASELRKARKGRGKTLEDLHEPL

<SEQ ID No.:0060;PRT;Methanopyrus kandleri>

40 VRRYVEPGKFVLP GDKITVAEAFYPGPGTYEDGGVVRAAITGRVEVDLEEREVRVE  
PYVDTPPKLKRASVIGRVQSVKEQVVLVKICFVDDRTDREPPTSGVGGIHISKVRD  
AYVEDLADEFQPGDIVRARVSTKMPVQLSTVGKEYGVVLAYCTRCRSELEKVKGR  
TLRCPVCGHTETRKVAAGYLREAESDA

<SEQ ID No.:0061;PRT;Methanopyrus kandleri>

45 LDPTKEVRNALVPHLKKLKDERVAVISDIDVDGLASAAILGHVLNNVGADFVLYFSPP  
ANFEEVVSIGIAPECDVLIADLGSTGETAIHDAKSEGCRVIVVDHHQVLEDVRPDVFI  
HDTRLCAAELCYWATVDLHERDLRLIAAYAAFTDYAEEYSRVLRETLKMYDRRKVY  
TEASLLDYALIRMDGEDRRELALKLPETPVSELDEVYELARDAMAEHEVLRREAREV  
50 AECLNEVVAYAIMDDVHPAMTGRVASHVAGVKRRPVGVCVRRGKISARVVEGEEID  
VARAIRKAATEVGGKGGGHAPAAGGVVPESRVEEFLRLFGEVVKRQVESARTRKS

- <SEQ ID No.:0062;PRT;Methanopyrus kandleri>  
LIDRR LAMELDGLEGFPEPKLSLEQYETPGEIVRVLLSIADREFGLECSRVLDLGAGT  
GRIGIGAALAGACEVTCVEVDSKAVEVARNVKRAVEDRVEVVEADVDRDFEPED  
QYDVTIMNPPFGAQRRGADRPFVEVALEASSGVVSLHRAGTEEFWKRRARELGAT  
5 CDAIGVVRFPPIAMYPHHRSRIRHVDVAVLVFKKVD
- <SEQ ID No.:0063;PRT;Methanopyrus kandleri>  
MMLPEHIICASCGRVGRKRTPPECPCYCGEKKFVRMDPEERLGKGPEWWKEAER  
ERRVRERL  
10
- <SEQ ID No.:0064;PRT;Methanopyrus kandleri>  
MPAGPVHLVYGVLLAVTSYPQNPEYGGMIVYASLAPDFATAAYNDRYSDLRYVDYR  
WAHDPHTHYDYASVIVERTTSRTLQGVDEKVALWCAETGIASHLLLDLYTHVKTSP  
KEWREQAGIRTVLQEFYYPWQENAVEFARWALGRAIRVFGNPDEFWRYVDGACA  
15 VAEQLMGDYVISAYLRRLSERYFGDPDLHLADWLRFYRNYGWEENATDAFIIDGV  
RIPADPVELLWSISQWDPRVPMRPPQSGGGGSLLLPVFPVPPVRRR
- <SEQ ID No.:0065;PRT;Methanopyrus kandleri>  
LPRYLRRRRRRRFLDGGDNDDDPLTGVANLFDAAMVFALAFITMSSSYGLTKILSP  
20 KTSEATIITKTTTGKVTVTKIYRTPSGLKVEQFKEVARAKRGGAGLGHMCKLGGAVY  
KAGKKYIWVPG
- <SEQ ID No.:0066;PRT;Methanopyrus kandleri>  
MVSIAITQALYVVMELLYPTIVLLLLFLAYSLMELAIFLREVAYRPRFTRKDLEQIA  
25 DKFPDVKRLPPHFSEFLRRVEKIVEKSDSADEASLKVEKELENLENFLASKVSRTRIV  
VRLGPMLGLMGTLIPLGPGLEQLAKGNIAGLATSLITAFATTVGLASAGACYVITLF  
RSRWYRKDVSDLEFLAETILQREFGG
- <SEQ ID No.:0067;PRT;Methanopyrus kandleri>  
VFHGVIAAFTTYLGASAAALMLRYHVSQVSEALTYGAVYGMAAAIGVGTGVMLTRV  
30 LGARKKRREVIRTVLEGTALSGVALLVGLLDVTAGAI AASSVALVPSYRISRD LGVS  
PFKIVTLLAVTSSVIVAALT SWMIVPAFADNP IYALAI AFFVFIVGLKTGLGIGFAGFQL  
RRGAMVIAALSGILIPAIIGLSHLVSKFMKTALAMQRYALLGHALLGLFLIGLGI FIARK  
WAVEGSAKDLSKLGAFFVAVPCICLTGVALSIAMYAEIGALNVTQAALVLWTCFVS  
35 TAYATLIVADAVIEVLKVPVAVALSGLENLVGLL FVITGIIAWAYPLWKRA PKLKLALPS  
PSKIGPWALLFLALMAFGYLWAVRKASRGNYPPDNPIDDIIRAVIEWLASRRR
- <SEQ ID No.:0068;PRT;Methanopyrus kandleri>  
LRWKVTAALVATLVISPALVHGSFDRHFQKYLRMERLQSAVSDIDGATKDVATVLAS  
40 SPYLAYKAALYDNTLRVGNDPGRDRLELLSAIRSAEHKLELARLKIRKARAKGVTGL  
DRAERNVSRALSALHRAEDRVEKRAPGVTDLDREIDALTPVLRTLTERKRWLVQEIT  
SKLPKFKYYELSENLLYLPPFNILFPLVGAFGP
- <SEQ ID No.:0069;PRT;Methanopyrus kandleri>  
45 VSRIGEIVTEMFQDGRFLGGMGEYAQTVAYDELLWFDVLFDDDEHILDEGDRVERK  
VGKLLTALYYGTVGYTVTEHTDEGNNSWIYVHAHT
- <SEQ ID No.:0070;PRT;Methanopyrus kandleri>  
VREPTREESEEIKVVDAYVKRFQRLVQLEREAEMKAMEEEIRKLSGKEREKKGRAV  
50 LGLRGTRAGREVGGYYLVKYGRSKEIDTQISVGDLVLVSRGDPLKSDLTGTVVEKT  
KRSITVAFDSPPPKWAVGKGIRIDLYANDVTFQRMMEALERIRHAEGRLREL RNTIIG  
LKNPSDAEPIDVDFVDTDLNYSQREAVEHALGAPDFFLIHGPPGTGKTRTITEVIVQE

- VRRGNKVLATAESNVAADNILEYLVERGVEAVRVGHPARVSKKLKERTLSAIVENHP  
LYRKAERLRERAYRLIEKRDYQRPVPRWRRGMSDETILYLAREGKGARGVPPRVI  
QSMKWIIHNRKVQKLFEEAERLEERAVREVLEEAEEVVTTNASAGLEFLEDIEFDV  
AVVDEGSQATEPSALIPISRAKRFIMAGDHKQLPPTILSEEAQPELSRTLFERLIEKHP  
5 KLSRMLRVQYRMHENIMEFPNREFYNGKLEAHSSVRRHTLEDLGVGDPDEVGRPWA  
DVLHPKEPLGFVDTSRLPERLRERRRRPGSKSRENPMEEAIVAFLEQLVRQGLSQ  
EDLAVISPYDDQVDLISKSLDELGLGDVEVNTVDGFGGREKEAIVVSFVRSNPKGEV  
GFLRDMRRLNVAITRPRRKLICIGDSGTLSSHPTYRRFIEHVKRSALIKPNNLREVA  
SYLDLVR LAPGRARG
- 10 <SEQ ID No.:0071;PRT;Methanopyrus kandleri>  
VRPFLSRLRALISYIKKTYDRVAVAYSGGTDSSVLLYAAVKALGRKNVACTACLPY  
VVNVCPPTPMDEVKQIRIRPDVEDVLEGRDEHPCYLCKRAIYEAIHETIGGVDGVLD  
GTNVSELTRGRPGLRALYELDVDPVMIKCGLDQTTSVLAAYLNLRARSGACSLVL  
15 SPEWPDVEVNDPGKLNRTARLRKPQSERWSLSECLEFTIHAPLPERRRRERYECVR  
RGDALVFRVLSGKVTEALASYFRECWNV
- <SEQ ID No.:0072;PRT;Methanopyrus kandleri>  
MIGRIFRRESKVVRDRLMKIRQTIDATEVDPTAVAETIGGPMESSSRSTEEGSEKAR  
20 QDEVEEEPSRESHEESSAAEEHSGVSAEAFLEMYSTRKGTAAVVAYPLYEICKTLCL  
AGILRRKTRKILEDLTAVRLPLLLASHNAVGPSTDLLEGFPPKASGYQVASPYADAL  
RSLAPESIAVMGYKSGHVGAEPLRGWKRMPCNVCSWGVEAAVADELWDQAPVAVA  
VTDITISALYGVYLSMLDAPALDFSYLWKFTKGKPLWRDPGRGGKHAIQWTQWKFL  
RELKLDYLIVVSLKDRRFKRVVRTLESEIKVKIVPIVSEDPRELGELLRTTLENQVPM  
25 VGGEVHRTFQVEPVLVEFVKRAILAPLPVSDFNEAKSSRFYPLIIDISIE
- <SEQ ID No.:0073;PRT;Methanopyrus kandleri>  
VETFVLAHNYQRPDVQLMADSVGDSLELALAEAREIDADRIVMCGVDFMAEVVKALN  
PDREVVPDHRACGMAMRLRAKELREFRREHPDAVVVVYVNTSAEVKAEADVM  
30 CTSANAVEVSSLPEDKIIIFVPDGNLAAWVQKHVPDKEVIPFPEHGCCPVHHSLSPS  
DLRELCSQHPDAVVVHPECPLVCAMADFGVSTQIRQYCEKEDASKIVMGTEEG  
LAFRIRRETGTEVIVPGHVMCPDMKINTGEKVERVLEARHVPEPLRVELDPDLISQV  
EEVVEEMFRLTR
- 35 <SEQ ID No.:0074;PRT;Methanopyrus kandleri>  
MMIRGDRLQVATDVHLHFNPNVKG DG YKVF EKFH RAGGTGFVSPVLT LRSYRIHGY  
GREDFERAYRLHLEGVRYGRLEYPLRGYAALGWHPAEVATLAEHPEEEVLNVAE  
TVCDLIEKFAAEYEEVVAVGEVGHYPVPAEVKRVCHKVFVRFLELAKDLDPVIY  
HGPKASRKHYMRLYEYLKDVGFDFDRFVRHRATPDVSAARNVGIWPSVPASRRSV  
40 REAAEHGPEFMLES DYLD D PRRPNAALPLRAVPKAA RILRTIDPDLVSEVMIEIPERV  
FGVEFEPLG
- <SEQ ID No.:0075;PRT;Methanopyrus kandleri>  
VWVELRRKYGRDRGHAPMSEEDVLRVKPKERPGVVFVTPDGRVHADLGHV RMVE  
45 DTVTLHSDPTEPPGPDNPSVIVPEHVLAALYVSGYAGAVVEIRGDPGHAHVWRAD  
CYLREAVEELGGPADPPEMGEPAAKRAFI REGEAPSTVRNVEGRIEPAEEFEVRVG  
GEEVSVHDLMTVRRGNVSNKTPEHAGLDVVADVAMLAGTACARVEISRPTVTSIH  
PTDLYLATAAKHGIRVCSLNVGRMRGAVNLEEGETVRVGTDLRYEVCITEEPVASEI  
KIGDVTLVREGGKFRVVEPGTVRLGDEVVEVG  
50
- <SEQ ID No.:0076;PRT;Methanopyrus kandleri>



LIDISSLSWAVALGVVRGLYVFAGSFIAAAVYRYVÁEERIRMTTSAFMGLLTAGFAAG  
PKELTALTYQNPVEMIAWAIATLFAIPARTYGDAIGERILRARIRASMPRTKVYRLP  
ENPNEIKDIPGEPPAPMEVKERIAGREYEFPRGTPKEEVERVIKRDLESETGIGRAVV  
RVRNGDVEVLVAGAKPPVSHTLPPDKVAVSVEPLGGAIHIGEGDRVRVFDGRELG  
5 EAEVWRRVDDRVLVMEERTAEEELLKEITQGKQVSLMAVRGEGS

<SEQ ID No.:0077;PRT;Methanopyrus kandleri>  
LELVLTGTGAGYSVEEDGVEIPSDWKELAEELADHGGTPVCMVIGPQDSGKTTLVTFI  
ANELVERGLKVGVVDADVGGQSDVGPPAVVSLGIVEDTVHDLSEVEMRHGYFVGSIT  
10 PSGLLLQTTVGTTRMVDLALAEGTDVVLIDTSGMVHGGPARALKLHKVDAIRPSHV  
AFLDRDGQVSHIKRMVKSLSKYIKVHDLAVPDAVKDVERKDRIRRRERVLREFFEERE  
ILELDLEEVSQRAFIGTGEPVDLEESELSALIKAVSGVEPEILHAERAPDAVVLVVK  
DQAGRIVGRGGRHARELRRLNREFVVVNEEELQGVLVGLCDGAGDLLGIGVIREI  
DFASGELKVEGRLLRDRITIRVQLGSLKVDPETGSHEPMNVRV  
15

<SEQ ID No.:0078;PRT;Methanopyrus kandleri>  
VTRMYVGIDHGTSGIKVAAYDGEDPEFLGKAPRRKVAERGLLRSLPDEARRAVEE  
AECICLNHYGMGDALTEFTPLEEAEDLGVGYGLRDTSGAGREFGAGRRMVEELSEL  
GVEAYLAPGIHRDLPRLDGAFRVFSHVASGEKLGARLALSSSKDIVVCDTSSNT  
20 VSVVVKDGEVIGGIDACLGAPGVLLQGPLDLEAIRRIDAGELSANGAFSTGGIVKIVNC  
AGEDPESAVEEFIQRCGKEEKEWLARLVAVEVAGLGWVYDCDEAWIGGTLSGDDE  
FMGVLERVLSKAFNKVAGLPPEASASMGLALIAADIASGARSVLGVRISSRP

<SEQ ID No.:0079;PRT;Methanopyrus kandleri>  
LISYLGPPGTFTEEAAERFSEEEELGGNGKLQSARTITAVFSRVERGEADYGVVPWE  
NSLEGSVGETLDNFLHRSVRVFGELVLPVHALMSGSEPDDREPVVYSHPPQAYEQA  
RETLRELLGNHEFVPTASTAEAAKLASKEGAYALGPPRLAERFGLDIMEEIRLENNE  
TRFAIISRRDRAPTKEKTSVVFVSVTDRPGALREILGIFADRGINLTKIESRPAKRGLG  
DYVFFLDFEGHRMLYPGSEALAE LRERTPF SKVLGSYPKVFP  
30

<SEQ ID No.:0080;PRT;Methanopyrus kandleri>  
VIEIRIHGRGGQGAVTAAEILAIAAKEDGKYSQAFFPFGVERRGAPVTAFARIDDEFIK  
IRSQIYEPDHVIVLDSSLLAVVDVTEGLPEDGLVINAREEELDKIMEKFEDSDVYTV  
ATQIALDELGVPIVNTAMVGAYLKASDILTDAVKKAIHARFSGEIAEKNVRAVERAY  
35 REVKAVG

<SEQ ID No.:0081;PRT;Methanopyrus kandleri>  
LGNEEFTIGAVVREPGSTKRNKTGRWRVFRPVLQDEKCMNCGLCFMYCPDGCIRP  
SDDGYVIDYDYCKGCGICESVCPVNAIEMVLEEG  
40

<SEQ ID No.:0082;PRT;Methanopyrus kandleri>  
MTEVHVINGNYAVAEAVRMVDVDVIAAYPITPQTPIVEYLSEFVSNGELDAEFIHVES  
EHSASAVLGASATGARVFTATASQGLALMHEILFIASGLRLPIVMAVANRALSAPINI  
WCDHSDSVAQRDTSWIQLYCESNQEVFDTVVQAYRIAEHEDVLLPVMVCLDGFTL  
45 SHTLEPVELPEEEEEVRSFVGKYEPHCHYLDPEDPMTLGPVGGPD SYMEFKMQHD  
AMEKAREVIGEVNREFSDEFGRSYGDGLIEEYNTEDADYVVIAMGSGVCGTVKHVID  
EERPDLVGLVRVKAYRPFGDRIVEVIQDKEGVVTIDRAHSYGAMPPLWTDVKAHAP  
DVDVSSTIAGLGGRDIRPQDVLEIKVAEEGKGMDPEVWINVKV

<SEQ ID No.:0083;PRT;Methanopyrus kandleri>  
VGNKRRVPIPEEELMAPGHRACAGCGSALCARLCMKALGKDTVVMPTGCIEVVT  
PYPETAWEVPWIHVAFENAAVASGIERALKALGKEDVTAVLAGDGGTVDIGFQA  
50

LSGMIERGHNIVYICYDNEAYMNTGVQRSGATPYFAATTTTPPGKIWKEMRPKKDI  
PKIIAAHGAPYVATACVSHQDQDLIKKVKKAKEVEGPAYVHVLCPGPPGWGHDSSSETI  
EIAKLAVETGMWVLYEIEENGFRITYRPKERKPVKEYLKRQKRFQHLSEDDIEKIQR  
MVDEQWKELEGKE

5

<SEQ ID No.:0084;PRT;Methanopyrus kandleri>  
VEGARREGVKAWVGLPGCIGCVLCAEACPIGAIEIVDGRPQKCIHCDPERAMCARA  
CPHHAIVQVCETLVVDRDRRCNGCGKCAEACPVGGIFIREDDAVKCDNCLDRDYPAC  
VEVCPVAGADVAPVNERVLWRRSRAARTLRNLPGSGGHARRLGSRARKHSRSH  
SRSVARGRN

10

<SEQ ID No.:0085;PRT;Methanopyrus kandleri>  
MPDDSDRELLESIAEATVEALRVAETKLPDDVLERVERALEEEEEDDHARMMLEAILE  
NVRIAEKGLPMCQDTGLITVFAEIGREFPLRLAGTIRDGIEEGIRRATEEIPLRPNVV  
HPISRENTGDNTGDRVPIVRFLPTKGEELRLHFLPKGFGSENSSAVTRLLPTEGLEG  
VREFVIKTVREAGGMPCPPIVLGVGVGGTIDEAAHLAKLALFRPLNVNRNPDPPEIAKLE  
EELLEINRLGVGPMGLGGRTTALAVNVELAYTHTAGLPVAVNVQCWAARRATAIV  
YPDGFFEVTQREYPRG

15

20

<SEQ ID No.:0086;PRT;Methanopyrus kandleri>  
LTEHHLEVPLEKEERLLEVEGDVYLSGTITARDKAHQRIEFGEEPPVDLEGA  
FHAGPVVRRVDDGYELVVIGPTTSTRMAKYLEDIVDAGVKLVGKGGMGPDAPEVM  
KDRAYVLTAPGGCAALLAERVKSIREVHWLDLGVPEAIWVLEVEEFGPLIVTVDAHG  
NELAGE

25

<SEQ ID No.:0087;PRT;Methanopyrus kandleri>  
VYVGRFLLAGKLEDGTPIAVYGVCSRSFSDRRIEVREGAAFVVPEDPSYITENPYVT  
YTCARIVDEFLVLTNGAQTDPADKLESGVPPREALVSVTFAMDYEHDEYNTPRISLI  
TDGETFWLGRVAPEEVYFRVMKPKDGEGLSVYGEYAEVPSKPNMTLDREDPLE  
CDPVPSFEHYVCSVIARHDGGRWSLEAR

30

<SEQ ID No.:0088;PRT;Methanopyrus kandleri>  
LKAWSKEAMTSFDVRATARELDSLEGALDKIYQVGERELKVKVHVPGVGSHYLV  
WEPGMRVHLTWRPKPSPDQPTSVSQALRNTLSGDRIERTQLGFDRILRFDLRSG  
RRVHVPELLPKGTAVTDENNVIERAFPARFRNRRAVVPGEVYEPPEGPPDPYELDR  
DAFLELLLEADRDLVRTLAVDVGLGGLYAAEVLLRAGLYERRESHASEFEDELEEL  
YETLRDLLEQISEGDLRPTLYRTTERDYVDVTPVPLERYSDELEMEEQDTFQALDE  
YYVTKFLAEKEREVREEWEREKRRRLERTIERQRSSIEQLRTKAELRGRANALYLN  
NLVDGILSELKKAERKGYSLEIKRRIQEAKGSGIEEVERIADIDVENRRVILRLPGEN  
GEVTVVPIDSDVHSTASKLFDRAKELERKAERAQEVLEQERELEKLLEEGPPEVE  
LEELTVELTKRRKKDWYERFRWFISSDGFVVGGSDAHTNEIILRRYLEEHDILVHAH  
VHGAPHVVIKTEGEEVPEITLREAAIFAASYRAWRWGLKAADVYVWTADQVDKS  
AEAPHGGAIIRGKRNRWFRRTTELKVAIGVQVEGGYRVMGGPVSAVKKKHCMTYGV  
EPGNERKSDVARRLFELFKKEVENLRRYLTVDVDMRAMPPGNARLLEV

45

<SEQ ID No.:0089;PRT;Methanopyrus kandleri>  
LEIFERPVEEIMTPAAEEVITAEPGEPLSKIFSKLERHGVKEIPIVDDGKVVGMISYYDV  
VDAHVADISNVRPETVMMKPETVPTDLIVEAITEMIDSGLRALPVVEDGEFVGLVTE  
YDIIDVARESDTLKIDAREVMSTPVITIHENDTIKARAIMRDHGISRLPVVNDANKL  
RGIVTTTDDIIREVIKPITRLGKMDRKGEKVPAFGHPVKKNIMSSPCVRAEPDETVDLC  
EKIVEHGIRGMPIVNKLLEPIGVVTRRDILRKIPELMRKRGVFVSLKGVDDVDFTLVI

50

LRKSIAAAVQKLASMRPSIEAVEVHIKRYHEEGNRHKYSVRIHVKDARNVISVKAHD  
WDLIAAFKNAIRHLVREVLGEEEEKEETVRRKEAVKAKIKRRTA

<SEQ ID No.:0090;PRT;Methanopyrus kandleri>

5 MRVGDLSGEPEYKLALAAVHQGLGILAGYLCATGYSIVLVMALLILPFALGKVLERLL  
ERERIGGAKGWLAYGLGAYLSAWILVWTFYINR

<SEQ ID No.:0091;PRT;Methanopyrus kandleri>

10 VVSIGRRVAVDRERCKGGSKCDYVCQRFPCPGVRTGRETITIDEDTNKPVISEELCS  
GCGICAQKCPFDAIKVVRLEPEEEEECVHKYEEGGFRLYRLPVPKPGKVTGVIGRNA  
IGKTTAAKILTDELKPNLGDPEADPDWDEVIRAFSGTELQEHFRRDIADGDLRPMKP  
QYVEALPKVVKGRVKDVLDELGVVDELIERLGLTEVTDRIISDLSSGELQRVAI  
AAALSRDADFLVFDEPCSYLDVEQRLSLARSLREIVEDRGIPMLVIEHDLATLDYVAD  
15 VVHVLYGKRGAYGVVSKPMGVGKGINAYLKGYLEAENVFRDEEVVLPEKPAAEAE  
AGERDTLVEYGEVLKEYDGDFFRLEVEPGEIRVGEIIGALGPNAIGKTTFFVKLLAGVLE  
PTGGGVDVDVKVSYKPQYLEVDSDEPVEQVLRRTAGSEWGSSWYRSNIVEPLDLE  
YLFDRPLCELSSGELQRVAVAAALSREADLYLLDEPSAYLDVEERINTARVIRRVIEA  
RDAAAIIVDHDLLLLDYISDRMMVFEGEPGKHGRANPPESKREAMNRFLSNLGVTF  
20 RRDPEPTRRPRANKPGSHRDREQKRRGEYFYA

<SEQ ID No.:0092;PRT;Methanopyrus kandleri>

MITVLVLGDAHIPERAQEVPHTLKRKIEELAPVDVVISPGDYTTEDTIEWIASLGEKAL  
MVVGNCDFGLPLPPRVTEDIGEVKVTVDHGGSGVHPRGDPDQLAAIAEEEGADVIFT  
25 GHTHRPEFKEHRGVLIVNPGSLTGVPSGGGSPSPGSPFMGTIDGKEVWMKLYMLK  
GDRLETEEFETEL

<SEQ ID No.:0093;PRT;Methanopyrus kandleri>

30 LKPVEPCDLEVYADLRVPPNTHLVLRIDGRAFTKLTRRLGLKKPYDRRFAEAMAETA  
VRMIRDAGLGITLVYTFSDLELNALIPRGNVPFSGRVEKLTSVSASCASTYFFRALQR  
HGIDPTGETVSFDSRCVVLTDDDLVDYFKWRQDEAWRNHLNSYAYWALRERGLKP  
KEAAERLRGMKAHDVHELLYREFGINLGRTPAWQRRGILAYRVAVNEDGVQRRRV  
TRDWAPPFFDESEGERLIRACASQGYVSLDPAPDQVEE

<SEQ ID No.:0094;PRT;Methanopyrus kandleri>

35 MKKLSLALVGAGGIGTTVLREIREGRLEGKVEPVLVCDRHPEKLRKIERWFPDCDTS  
TDLDDAMSAEADVLEEAASVEAAASLLPDALKRFDVIVMSVGALVLEEGLLSRCREV  
AEVTGHRHLHVPSPGAVGGLDVLRLRGRVREVLTITIKPPKALNKDVSERTVLYEGS  
VRDAVRKFPKNINVAASVSLAVGDPSLVTVRIVCDPEVSVNTHVIEVESSAGTYRFE  
40 LRNEALPDNPKTSAAVAAYSAVALIERMTEGIRVGT

<SEQ ID No.:0095;PRT;Methanopyrus kandleri>

MSVAIVEHLDRWSPWLDLEYMEAYRTARKHGWFTVTNADPEVLAKAKYPALPYS  
ASKLPLRGDRVIVLDPDAEDPLTPEDDPDVVIVGGILGDYPRRHRTREELTPRFPDA  
45 EVRHLGPYHFSIDGALRVALTVLECGVPLEEIQVVERPEIEVAPGHTVRLDCDYPSE  
GKPMLEPEGLVEYLKEGIVDYEEAEFSARRRWRHRNDGVEGDP

<SEQ ID No.:0096;PRT;Methanopyrus kandleri>

VTNGESSNEEEYRKRYVRFQRLLGMEVFTEDGRRVGTVEDVTFDPRTGDLVRFLVI  
VTEQPSGGGGLPLPGGGGRRTETVDAELVKAVGDIIEESPEKASSGEEGKRKKQES  
50 SPAKPSDLEI

<SEQ ID No.:0097;PRT;Methanopyrus kandleri>

VEVVGIIHHGHDAGAALIRDGEIVAAANEERFSRKKFHRGFPERSLQFVLERSNDVD  
VLAVAGLYRKRKDLERVRDIAEELEVPVYLVEHHAHAASAYYTSGFNRLTITVDA  
AGDGLSATVWVCERGEMHRVSTESYYDSLGDIFYANVTELLGFEPMKDEGKVMCL  
AAYAEPDLRSVEWIRREVIDVEEGNIVNRLGAISGEAVRRLKRSKLAKMGRERAAAV  
5 AQEALEELLLEYFGHYVNEYGENRIAYAGGVAANVVANMRLREELNIDLFVHPNMG  
DGGLAVGAALWAWAEEELARGRRPEPRRLEDVYFGPEYDREEVRKALEEHDMTD  
RAEYVGKDPDAIVRKLLEGKTVALFHSRMEYGPRALGARSILADPRDRGVVDKLNLR  
DLGRDPFQPFAPTILSEDAPEYLRRPCESPMTLAFRATDTFRRKAPAVVHVDGTT  
10 RPQTLRDELFPFYREVIETFREETGLGAVLNTSFNPHGEPVCSPRDALEAFEHGVAD  
VLWIEGYMIERG

<SEQ ID No.:0098;PRT;Methanopyrus kandleri>  
VPRPKVLYNVGMTADGKVVTAAAGDSRISGEEDLKEVHRLRAEHDAVAVGINTVRKD  
DPMLNVRLVEGEDPIRVVFDTECSIPLDCRLVRTARDIPTVVLCAEADPGRVEKLEK  
15 RGVKVEEVGACEDGVDVERGLELLYDMGVRTLLEGGPTLAWSFLKRGGLIDEFRVA  
VAPVLVGGSDALTPVEGEGFPRVDLGVGLELKRVERVGRDVVLWYEVSGSAADLA  
SEHEEARGRSS

<SEQ ID No.:0099;PRT;Methanopyrus kandleri>  
20 MKCPECGTEMRSELRDDGVELLRCPECGKEIKRVPSYREFGLKCPNFFEMTVPEW  
DEEVLGKEVVVVVKYRSPDGYRRRKIRGKAVRIDNRGNLVIRREDGFEVSLYPQVV  
ENIKVLE

<SEQ ID No.:0100;PRT;Methanopyrus kandleri>  
25 VRAAVTMIAFVVLMSPVCAEVHILTWAGEGADSTCVARTKEIVDWWDTYRAIGPDT  
TIVWHYTTRVDRWRTVLETGTDPLTGARISVVYPGGWHPERYWDFDWVRALYHA  
QIDLIGYVGICAGAYLHAGNTTYSTSGPGHDDVLQDGVTVIDGMNGPNRICRVLIL  
QDNPLTPEWTWGNVFTYKYWNGPGFGPEPGLEFNSSYKCWVKITNIEGREVMIKI  
WPVGEYVDTCKGWAIVAGQYFVKEGDKWVPRGRFVLFGPHPELTSRTGAHALLAK  
30 AILWAAGAKVPMEPQSPVQVVPKGTIPKALVAADVATALTFVLPEDVKEELFTAS  
DPITQGIFETISNVIQDKLGLEVPPELTLTVTVATVVVYALEALIEWLFGTAPAPASA

<SEQ ID No.:0101;PRT;Methanopyrus kandleri>  
35 MGLYLGVEGIDGVGKSSVNLAAEFLEIHGLEVTTVREPSTDIGREALEWDDPYLQA  
LAFTLDRMLTLKRVDFAADVLSDRFTLSTLAYQSALGADMRWLLELQRPVPKPD  
VVIIDREPLAEDATFDKEFLERVNRNRYREAAARLIEEEFDVEIKWIEAEDMDKEEIAEL  
IVADARRRLDDPLGIPDDLLEG

<SEQ ID No.:0102;PRT;Methanopyrus kandleri>  
40 VSYRRGADFERQLVRYLREHGGEAVRVAGSGGAVDVVGYAPAMGHVAVECKVRR  
DDRLYVEKEEIEGLTTFAERFRAEPLIAWKPPHVRTGLPLNAVLFPPDLMEERERTY  
VIDLETALEEGIDASRLVTRPLDHYRR

<SEQ ID No.:0103;PRT;Methanopyrus kandleri>  
45 VCGIACAVGDDDDIAAMVTAMEHRGPDGRGFASVSDDGVEFSEEPPEGEVVLGHV  
RLWVRGEASAVQPIVEEDRAVAVNGEIYNYRRFVEDAPSDSWAVFEVRSVRDAA  
AALRVLRGEYAFVAAFRDGTVAARDPIGVRLPYCYEAGLAVASERKALWAAGFR  
DVRRVPPGALLVLRDGRVELRNVVDVPRSRPGRSSWKDLLEVLQRSVRERVEETE  
RVGVVLSGGVDSSTVAKLASEYVDVKCYAAGFEGSDDVEVAERLCDEMGWPFVS  
50 VSLEDEFERYVATVYAVETWNPMKVEVGIPILACAGAMSDDGIRVMLSGQGADEL  
LGGYHRHLRHYGDWDRFSWELWKDVAAIHAVNLERDDKAGMHHSVELRVPYLDL  
DVVRTGLGIDPRENVSGPEDNLRKRALRRVAAELGLPDFVVERRKRATQYGSLSK

MLDKLVRELGIKRAVAKRLGYRSHKELFLRLVGKYLGFWEAPSVEEVERECARLG  
VEPEISEFLEERVLTDFDSDLRAG

<SEQ ID No.:0104;PRT;Methanopyrus kandleri>

5 MVVLAFLVILLALTPLQPVQGQEVGTLAEHLRKAYGEDWPHYAPWVHSEIKVADDV  
KAYNLRAVDLGYDLVPGVPAHGVLVAYASSSKVGLAFVNRTGEFFKLCEVPLEAPP  
KYREGLDLDYMEAEGDSTKKTVLIWAGADNRLYALRVKLG VYRPHENANFPAVAEV  
SNPIEIDLPPGYTDVKRVRVLALGDKFVFFFTARREDKPTTEYGYDLFYALIDPDGTV  
10 KLGPKDFGFGDIMVFQVKPLNGPSLIGLAFMGRWRQYIAGVWWVTMRLEGNSIKVI  
QTTLISDSDFEIPCVERALLDFSYPINSDEYSVLVWVWVNDRCRCPKVLFERIAQLVPGA  
EFRYRKDKTWVYVGQRLKVDKNGYTSKLGKNFPMYLMVTQTQTISGGAVES  
WDITFGEIDSVTVYTTTHGSEEKYFVVDASIKVFDVAISKWLNARTGEFEEKNTYGF  
DILSVPLPVNPDSPGIVGTEVDMADVEVSLTNFGTSQTKQKWVAYPVFNKGGCEIIP  
KDQPSPECFIYLYGTIQFNETHATETPIVAADQTDVKARLLPDGVIIEGFIENINKKPSL  
15 FVMPVAVVGPVKDIYLEYDTPDELLHKYIYPLDPFTVLKFRPIRTEDHPGAQVGPVT  
YDLRSQQPALPTVYLEVSYTTDFSDRVAPGALVEILGPAPPEEPTPGTPLSGYAIIG  
DPEVMRSENVEIERIVNEELAETQVHVKFLPPAVETLERIAQVVASGTIDREAVREAA  
SDALDELSKYLKQYNLLQSPSGIPA EVDSALQTLGELRDRAQDMKDEELVMKLN TVI  
NNLKR LVEGTYHVFVLYHPVGSVQEYPKSIENREDLKRLVNELAYTGVT SWIPIDVD  
20 CEVPNVVPPETRTTETSGTALITEVPVLPPTESHSSAPKAGSQGQRGTEPVKPRGS  
AGGTSSNPTPLLPVYRRGLSRPRLRRRSCTRRAR

<SEQ ID No.:0105;PRT;Methanopyrus kandleri>

25 MREEAPPKIPEGLRITATRTMAAARPEEPEPTLRLFRFSPDREL VLEEKLDGTNVR  
VYLEGDRLLAHTRGWVDADEYLRGLDIEPPWEDLRGEFDRITILEGELLPYDLFSQE  
SPRLHELAGRLETEVLF DGEPSDLTAELVYLEGKRYECRPEPLFSRVCELDPDHELI  
QRFLRENQVKPDFESAVAEGKLEPRVC FYELDMLEGSVKITAPRTEQLRECRRLST  
EPPRWVRVVDPPDGLERELDRLEARNWCEGLCVKPMVETDDKLHVKLRCPWFL  
RREFDGRPPRRGSHKVAGRITAQLLQTKVLHKNLRELEGKRGVLDKKWRKLSERT  
30 QRALRVQDRLLSLGLDSPRL

<SEQ ID No.:0106;PRT;Methanopyrus kandleri>

35 VTLMEECRRTVPD TVRKIAEEEGVRPEKLARRVAEGRVVP AHADRRDEVRPVGIG  
EGLRVKINANVGTSP EVCDPDLEVEKARA AVDHGADTVMDLSTGGDLREIRRRIMK  
AVDVPVGTVPVYEA AEMTRRGRAVVDMD EDDMLRAIERHMEDGVDFMTVHCAV  
TLDALEDVLRGRALGIVSRGGAIVA AWMIHHAENPLYENFDYILELAREHDVTL SL  
GDAMRPGSVLDANDAAQHREL VVQGELVDRCREAGVQAMVEGPGHVPLDQIPAV  
VRLQKRVC DGAPFYVLGPVPTDVAPGYDHIAAAIGGAIAAYHGADFLCYVTPAEHLA  
LPDVKDVILGVIATRIAAHAADTARGMKYARRENEEMAEARWNLDWDRQFEL AIDP  
40 KKPRHYREERPPQAKELCSMCGEYCAIKILKDALEERR

<SEQ ID No.:0107;PRT;Methanopyrus kandleri>

45 MIHPSRLFVKLSASPRVDGEIVACGTYDPITEEEREIVETLNSMYMLLTRFEGYPLP  
APQVISNELGEVAEELRREGFGLTKIEQFKYDDPEVALVSKIVLDETRYVYCTYRNE  
NDLQSLAHECQCTVLECGGGEATVEAPSKFHALRF AVQVPLRLHGSAAIGLTQAAA  
TERFAKAERHADSEFAAFSKIGA EWIIHRGGDPLPPPRRTNTAPDRILYLDIVGSSEL  
VRERGRYLEGIMSRVIDVINEEEGVLDHRRGGDDVIARFPTKSRLAAIKIVGRL  
TEDDVKIKIGIGDSRGRAENAVTVRERVDYDCSYIAFRFGPYLVAYVEPPDYAVRIF  
GRIPSESVRAVGASAIVGSALTALHPYLALPFFVYFPIAAAHNRNDSASVAVWWFLIWW  
50 LVTL SAAWFGLYVREHYLPRPLVLEMNALFSQLMNLAKTMAARAGAGTP

<SEQ ID No.:0108;PRT;Methanopyrus kandleri>

VAKAERSDAGKDKVWIPDEEAKRIGADVSLQVLDALAKRDYPVYDLKKHAELDVR  
 VAREVVREIGGMAGLEFSLKGVDTVLDFLSKIPVVKTVVAEEEELEPVAEEDRYVCFI  
 AVDPNRYRELREKAGAI AVTAREELDLHTPLVLVRNDLCVGPEEFGVLALHSSEVA  
 KERPPFKVEVLVGEDLKPTMIRLARFIAS TVATRTVYLKFPYVVVKESLLVEKGDYKV  
 5 RVKTPREEVE

<SEQ ID No.:0109;PRT;Methanopyrus kandleri>

LRVVMKFGGTSVGTGESIRKVAKIVTDAEEHEVIVVVSAMSGVTDELVRAAESAPD  
 WTEEDVKNFVGKLRRRHGKAASEAISSDLIRREVMGYVDSLLEELEKVLLGLSYVG  
 10 EVTPRSM DLILSFGERMSAPIVAGALRDRGLEAEHLEGGEAGVITDDGFGEAEPILP  
 ACRRKAQKTLIPMIESGKIPVITGFIGRTIDGEVTTLGRGGS DYSAIIGCISEADEVQI  
 WTDVDGVMTANPNLVPDARTVPRLSYEEAMELASFGAEVLHPKTVIPARSENIPRV  
 KNTFNPES EGT LITSESEPSEQVVKAVASSSDVGMIDIRGTTMIGRPGVAGRIFSR  
 GDEGINVIMISQSASESNISIVSRPEVRRARIIEREFVGERVVERVTTYEDVAVVAV  
 15 VGEGMRGTPGVASRVFRAVADAGVNIKTISQGASEVNISFVVAEEDEAAAVNAVHS  
 EFELGEEA

<SEQ ID No.:0110;PRT;Methanopyrus kandleri>

MIRRLVERYLRHVTKKRLTRRPTTALIYTCLLGMKAIARAFSEETISSISPEPLWTVES  
 20 VSLVRIGTYPGDVLCSELVSFLTREFEEEEERVEDVLPVEVEVEAEFLARVRRFNDLLY  
 EDIELPFEIEGTGEEEPDLDLRLIEVLLALDEIPQSEQGRYAKPFILTCFETLSDYLDVL  
 GLRWSDVDTVRRKVRIKGRVHRISRALAYELRRIPREGEEVFPISSDVMRWERAV  
 SKEVGRRLRFL

<SEQ ID No.:0111;PRT;Methanopyrus kandleri>

MYAPVRRGCSKLKLPEHVREYLDRKGIWELFPPQREAVEKGLFDDENLLIAAPTAS  
 GKTLLAEMRALHELIESHGETRVVYVPFRALAREKYEELTNVIEFCREKGLEPTIEIS  
 TGDVRRPIREL RP GITVTTAEKLDASLRSPSLVEEVDLLVLDEVHIVGDRNRGATYE  
 ALIALVRTFREKVSL LALSATVGNAAELADWLDATPVISDWRPVKLEHRIVEVPSASE  
 30 KDAKVRKLIRKCLREGGQALVFLYSRRRAMTEAKNLSRTVSGLLSEDEKKELRTLAE  
 RVSELGEGEETEILAYAVMRGVAFHHAGLTAEQRALVEDAFREGLLKVVVSTPTLAA  
 GVNLPARYVIIKDFGMRLGNEIKPTKNEFKQMAGRAGRPGYDDMGLVFLTTSNWK  
 ELAEEYVHSEADPVQSRIWVSGPQLRRFLLGLVAAGFCRQIADV MRVALNTFMSSV  
 NIRPEDAVLSSLKMLVDWGFLEELEGELTATKVGHAVSQSYLTPDSAKFLLRCMEE  
 35 VGTEENVVLPSITLCPDFQPAPISSKSRELSTLDAFMGGSPSIEADEVLELAVEEFGY  
 DDWELERRLAWAEALSDWVSGSPDRSILRKYDLYPGDLYRAKDDAAWIAWGM SR  
 LARAAGITWRSPLLSRRL EYGV PKEALEL TEVEGVGRTLAMRLYRAGYHSVRDLAE  
 ATPELTRVRGIGEQLARKILESARRLTGT

<SEQ ID No.:0112;PRT;Methanopyrus kandleri>

LRRLKIEGRAYIHPTATVLGEVELGQDASLWPGAVVRGDLEPVRIGRESNIQDNAV  
 40 HVSKGY PVEIGDRVSVGHGAVVHGATIEEDCLIGMNATVMNGAVIRRGSIIGAGAVV  
 TEGTEVG PYEIWVGVP AKRIGTTDEERVDEIRENARRY LKLAREELPEWRG

<SEQ ID No.:0113;PRT;Methanopyrus kandleri>

MGCECIGGNVVKALGLDVGGAHTDAALVRYDEDGKVMVLGTD RVYLPMWKKKKR  
 LKKTIKRIVHKFKPDVVGLTMTGELADAFNTRREGVEYIVRTVTSACHAPVYVVTSD  
 GSTVPPEEALRRWREVASANWRATAEVLAVHVRPGSYLLVDLGSTTLDLIPIIRGEVA  
 AEGRTDLERMKN GELAYLGALRTPISFLLREVEIDGEPVPVSYEYFSIVADALLLGEI  
 50 DPEDYTPETPDGRGKSPEECARRLARTVCSDPEELGWEGVMDLAKTAVRALLGQL  
 LKHIELKLQEHGLDTVVAAGAGDFLIEMACKRIGVEVEPFDEIFGKGSEVAPAVGA AF  
 LAIRR



<SEQ ID No.:0114;PRT;Methanopyrus kandleri>

MRVYIY EYAVATGDEEFLAEGRAMLESLLRAFAKSGYETLTVAHPSVGVRWADEVL  
RDETQALECADLTLVIAPESDGLLESKVREYSRETEVIGPTPRAIRVAADKRKTEDAL  
5 RDARSFQLPTREADVMVSKPADGAGSEGVRI GRGELSRELIPGSHHSLLCVSDGET  
VDVLGINDQFVAFAGREL VYLGGRTPSDHREL TRIARDIAEEVVERIPGLVGLFGVDL  
VMKGGEPYLI EVNPRPTTPTVAAALEHPEAVVRSLLEGPTGKVLRYRREYVYVKRG  
AEALVPEKFEVVEDFHGLRVYRG

<SEQ ID No.:0115;PRT;Methanopyrus kandleri>

MTDIVYDVEGFRAFLPKETLRWIRHRELERKVG VVEKFSDRVGPIPV EIRRRRSQYG  
EFYHAGKGTTRI QARVSAAMECVERAAAEPREEI IERGPEGDKWTPAWYRTEPRE  
WVEGVDLT TREPVYVPANEV FHPWLGDALPSHTNGLSAGRLREEAVIQGLLEVVER  
DSWSIVEYFRIHPPELEVHGELEELRRSLEREVGRVELRLLPSRVEGVYVVGAVTEA  
15 ERVEEMVMGFGASPDPEMAVLRALLEVAQGLSMARRGIESPVRKGLGEFSAPGKL  
TPERLKRNLNRHWFEP EGTVEIDDLDRVITTSLEKLTEELVERVAEAGLGKVIEVDLT  
LENLDVPVVRVVTGASEYVIDEARVGNMPEKPPGVPMG

<SEQ ID No.:0116;PRT;Methanopyrus kandleri>

VEINGVEIEDTFAEAFEAKMARVLITAASHKWAMI AVKEATGFGTSVIMCPAEAGIDC  
GYVPPEETPDGRPGVTIMIGHNDEDELKEQLLD RIGQCVM TAPTASAFDAMPEAEK  
EDEDRVGYKLSFFGDGYQEEDELDGRKVWKIPVVEGEFIVEDSFGITTVAGGNFYI  
MAESQPAGLQAAEA AVDAIKGVEGAYAPFP GGIVASASKVGSKQYDFLPASTNDAY  
25 CPTVEDNELPEGVKCVYEIVINGLNEEAVKEAMRVGIEAACQQPGVVKISAGNFGG  
KLGQYEIHLHDLF

<SEQ ID No.:0117;PRT;Methanopyrus kandleri>

VSVSVS VDAETNVVGLIGHPV EHSLS PAMHNAAFKELGLNYVYLAFDVPPERLEGA  
VRGAADLGIVGLNVTIPHKEAVMELCDELDRDAELIGAVNTVRF SRGKIEGFNTDGE  
30 GFLRALREETYFDPRGTKSVILGAGGAARAVSFKLATEGADEIVIANRTVDRAERLA  
EELKEKVGVKARAIGLDGDEIERELRDADLLVDATPVGMYPNEDEPPLVTADQMHE  
DLIVNDLVYNPPRTRLLEEA EKAGATPVSGVGMLVYQGALAFELWTGEEAPVEVMR  
EAVLEHLR

<SEQ ID No.:0118;PRT;Methanopyrus kandleri>

MLDVTRLPGDRLLISSDIHVGDEYQGH DRETWEAALDLARDFDAFLIDGDLADPRAS  
DPELRELLRDLRELSSEVPTYFVPGNHDTVDLVKSLRDAGVHVLSRRYDNRRGRG  
CPPGHSGPSLGGPHLLRFGDAWMLVLHGHEPCSELGLNPQKPVNPVARESMPK  
RDQILDNYTCREYEMPDRLEE IARSTHADVVITGHTHCRYLGSLEGKLVNVGTTS  
40 PAICATCRDPLNVGNVCILKASGGTLRAKLFNLRKARVIGRERVRIGRR

<SEQ ID No.:0119;PRT;Methanopyrus kandleri>

MEVPLLEVLLYTDG SVTRILERFFEEVTIDPLETRKLV EGREARLLGVPDGD TVYVR  
RVVIKVDGRPAILATSLARPDNLPGRRLRLVLQSRKPLGKMIEELRLETRREILRVEE  
45 ARPSPEDEEILDVSVPKIPWREYLVYHRRTPMLLIRERFNPEVLGREG

<SEQ ID No.:0120;PRT;Methanopyrus kandleri>

MMLSEDKLQKIKEL ENQLVKTREELDDLEEK RQEIQRKIDQLRSQIHEIRERA EKYRA  
KRDELNERVREL RERADEHRRRRDELNEEVQQYKAKRDELNERARELAQKAREHV  
50 ETAKKLRSKVGRPIREIRAEIRRLEREIETNPLSPRREEQIAQRLEELREQLRAW EKA  
NEHSSKADELFSQADELREKASEYHEKVVKTAEEADKYHQKMIECYERADKLREKA

DGYHRKYVEELAKVKPLEDELRELQSELRLDLEQKIMEKRAEERALEVRIKDLEKQAV  
DEERLKEIKERLERGERKVSWEELQLLQEYGE

<SEQ ID No.:0121;PRT;Methanopyrus kandleri>

5 MAQARRLVVLDGTLVDGETIDLIAEAAAGVDDEVEEITRRAMRGELEFGALRERV  
RLLAGTPASVLDEVVTELRLNPGVREFVAAVRSVGA AVAVISGGFTEV VSHFCREL  
GLDAYVANELEVRNGFLTGRVYGPVMSSSAKGRVLMELCRRFGTRPEDTVAVGDG  
ANDASMLKRVGLPLGFRPKKPLYEIIEMAFDDFRRVPVVLRFWGVPE

10 <SEQ ID No.:0122;PRT;Methanopyrus kandleri>

VFGLEDVHSVVRAVEKHHHEWLKKCLPMIASENVTS PAVREMLVTD FGHRYAEGKP  
GERLYEGCEYIDEVELACVRLAKELFGAEHANVQPTSGVVANLAALFALTEPGDTIL  
GLRISHGGHISHHDISAPGVRGLNVEYLPFDEEDMAIDVDGMVRKIEEVEPSVVMLG  
ASLFLFPHPVEEAVEAVEAVGGYVYDAAHVLGLIAGGQFQDPIREGAHVVTGSTH  
15 KTFPGPQGGIVLCQRDLADDIDEAVFPGLVSNHHLHHVAALAVALA EFKEYGERYA  
RDTVRNAKALAEALYA EGLRVLC EHRGFTESHQIAVDVREQGGGAVIAEKLESANIL  
CNKNLLPWDDDESKSHDPSGIRLGTQELTRLGMGLSEMEYIAELIADVVLGRREPSE  
VRKDVEELRREFQEVKYGFGSGVGAHEWPRLADW

20 <SEQ ID No.:0123;PRT;Methanopyrus kandleri>

LVEARALAEAVTKGVLTHVEVSVKPGSGLVLDVDVPRADRVKDIVRSLVTPITGMYQ  
VRVRITNARAEPEAANKKCLATGTFTALGKALMDAFFPGRGTEAVNKALLRVPITSE  
EAYRGRKRFDRVYDPRKKRWIPARPGMMCR TKDGMICAVTDDPDGIAPPAAAEKDA  
KLATVLCDTLFDMLLA EKPPTVRG

25 <SEQ ID No.:0124;PRT;Methanopyrus kandleri>

VRPESEGV RQAARLMAVAARTAPKTRGIDDIVIEVEDEDTLEKIAERMEEIAEEKGA  
DFFKRDAECLRRSECLVLIGVKSSGPCGLNCGMCGASCDDIEERSADVEFAGPICG  
FKLIDLGIALGSAKVANDLVVDNRLMYTIGVAARSLGVVDADVIGIPLSATGKNIYF  
30 DREG

<SEQ ID No.:0125;PRT;Methanopyrus kandleri>

MARNPRRKGRDGWKQSKSRGKPSFVTCECCGGKVPRHKAIPWTQGFRITDPVVR  
QAVDDRYVHTFSRKVYYCPKCARFLGIRKPKRR

35 <SEQ ID No.:0126;PRT;Methanopyrus kandleri>

LGGGSVGHVVADALDRGEEVIVDCNEDRAEVLREQGFDVIIGDITEKEVLLKAGI  
ERAVMVYVLT PDDANAEAIRLIREINEDTYVIARVTDEERVEEFKELGADEVLS PNQ  
LLVEKLLHNIDNVRNRK VHELLTKLEDVETLAIIPHNNPD PDSIASAVALQEIASIVDV  
40 QSDVYGGGEIGHQENKALVNLLDIEMKRISRVDLDEYDAIAVVDTPVLPRELA EYDGI  
EDRILVAVDHHDDSSDGMMDMNGT SKSALELADFVDHRPEVGAASTILTQYLKILDR  
NVDRIATALLYGIRTD LNFTRNVSPEDLKAAAYLYPRADHEALAKIESPDISPETLD  
VLGEAIRNRTVIRS YLFSNVGFVNEDALPQAADYLLNLEGVHTVIVFGVNGKV KIS  
ARTDDIRLNIGEIMKEAFGDVGSAGGHSKAAA AEIPLGIFQDVESDMVLDLVEQAVR  
45 KRIFKVI GIEEEED

<SEQ ID No.:0127;PRT;Methanopyrus kandleri>

VNGLCGIVGYTGERDAAPIVDSLVRLEYRGYDSAGVATIHEGRLYLEKDAGKLTEG  
GEPTKLQRSLRKLPGKIGIGHTRWATHGDPNRRNAHPHTDCRDEIAV VHNHNGIENFM  
50 QLREELEDKGHRFDSETDTEVPHLIEQGMKEGKSFF EAFVEAVRRLEGSYAIAAIC  
TREP DVILAARKESPLV VGLGDDGNFLASDIPAILPETNRVIPIDDGEIVVVKRDEV RIL  
DAETLEDVTEEKEVQIVEEDPHTLERRGYPHFMLKEIHEQPEAVRNTLR IERENLME

MAEELVGGDYTKLYIVACGTSYHAGLGAKYATELLAKFPVDVVIASEFRYVTKELVD  
ENTLVLAISQSGETADTLAAVREANARGATTIALTNNVGSTITREVDHVMYTHAGFE  
KAVAATKTYTAQLAAMYTLAVELARHFGEITNKEAEEYHAELNKVPEMLEEVLSWE  
REREIAVMGGRYKERPNWFFIGRGPGYPTAMEGALKLKEITYQHAEAYPAGELKHG  
5 PLALIEEGVPVVAQAQPGGVYEKMLANIEEVKARGATVITVADEKDEAVEEHSDHVI  
RVPSISEVFSPIVYTVPLQLLAYYMSVARGIDPDYPRNLAKSVTVE

<SEQ ID No.:0128;PRT;Methanopyrus kandleri>  
VIRLDVRERVVKLLCDYISIPSVSGEEEELSERYASDLERAGLEVEIDRLGNVIGRRG  
10 EPEVCLTSHLDTVPPDEMEKPFEPRIVDGKLYGRGACDAKANLAVYATLAEIWDGP  
LEIIAVVREETDSAGIRHVLRRGEIQANHVINGEPTELRPVIGHKSRVEVRLCIEGEPK  
HAGSHNPENPILKFCKILHDLHEMLEDLEDALGVPTANPTSVHSRGVATNVTPQCLE  
AVLDVRLNTQLSPEDLERFFHEVEGVSAEIRAGAPPFVLSGDEPVVRALREALSAR  
GLPDEPITWPASTDAGYIRNLGGKDVVFGPGSIDYAHSPSEHVPIEELVDAVRVLY  
15 DWEYLSS

<SEQ ID No.:0129;PRT;Methanopyrus kandleri>  
VREEDLDWEEIGLRVGLIHRQLDTSRKLFRCRTPELVEEVPKEPKVRRKLRPVQS  
EMGEFDPAALEEFKRDRTFYLLADGSFSCVELDEEPPHEPCSEALDVAIKVTLLG  
20 GSVVDEVHVMRKMVIDGNSNTTGFRQRTMLVGFGEVPTSEGPVRISTVCLEEDAAR  
KVKGRDQDLEVDYCLDRLGIPLIEVSTEPDIRTPEQAREAAERIGEAIAVGGVKSGI  
GTVRQDVNVISIEGGAVQEIKGVQDLNLIPKVVKYEALRQANLLRIRDELRRGVSET  
DLIDCEPMDVTDVFEDTDSEVIRRELERGGVVYALLPGFEGILGWELCPGRRFGTE  
LADYARRRGVSGLFHSDLPKYGISEEEVEAVRQRLGAEDGDGFVLIAGPEDRVKS  
25 AMEAVKDRAIMALKGVPAETRRARKDGTTEYMRPRPGAARMYPETDIPPVIDEDR  
VKELAEELPEKPWERKERLAEYGLGEELVEQMFEHGVVDEFEEIVEETGVEPKVA  
AATLVNTIPRLEKDGYPVDNLTIDHVKEVLRLYAEGAIKSGIEELLGALAADPDSDP  
EELAEELGIVMASEEEIEEVVEEAIRRYEDKIRERGMAMVGKIMGEVMEVLRGRADG  
KRVSELVRERIREISGE  
30

<SEQ ID No.:0130;PRT;Methanopyrus kandleri>  
VLEVTLPGEGTPPAEGFRTLHSLKRDLERYFRGYPVDFDDVPVRINVSGKPREVLEL  
VREIPYGTVVTYGDIAQKANTHPRVVGVS LARNRVPIIVACHRVVAADGLGGFRWG  
LEWKRRLLLELEGALPSRR  
35

<SEQ ID No.:0131;PRT;Methanopyrus kandleri>  
VIVDREELEYDGSQRLRRAFAHERYGIKGRAVVVFRGPM DV RTEYTADAEDVGSPIR  
GNDVLHLLVDDPTRADPLVAGLLQRLLVVVTKEVIEKELSTDLD RDGDLLHDGRKL  
TVSVFKPAGPGSLAHLGINVTTEGVVPASSLRDLGYRGDPLDLGRRVAVEFVREIT  
40 DVELDLTKIRW

<SEQ ID No.:0132;PRT;Methanopyrus kandleri>  
VVRDLNEAVVIRIETPERSERVKVPYREGMTLLDALRWIKEHEIPDLEFEFSCRNAQ  
CGTCAVLVNGKARLACEYRLEPGQEVTVGPLRHLPVVKDLAVDWSAVTSRLRPLS  
45 PKSHREWFRMEPEKQRKLYELRSCIECLCCVAECPVIKAGSARNPGPIVLRKVAE  
EAEKWDESPEIDDSVYACTTCHTCAEVCPKDIEIPAKAVETVRARLYEEGKGPLPEH  
KELGERAVRTGRSVEKRDRSFLEEYSGEYGEGDV KAMFFT GCLVDYRLPDTGKAL  
VRLAEELGIRLIVPREQVCCGSPLLRTGQHDRAERLAFENLETFRVDPDVIVTVCA  
GCGATLKNNYPELLGDRFEWDVLDVTELLVEIRAHERGFRLPERTTVTYHDPCHLK  
50 RGQGVEDEPRKLIRSIENVEFVEMEEDRCCGAGGGVRSGLPELAELMSDVKAHM  
VRETGAEVLTTVCPFCEYNLREGLERNDVEARVENLTVLLSRL

<SEQ ID No.:0133;PRT;Methanopyrus kandleri>

MSGDKDRRLPFDRDREMITKAEVETDPRYGCPPEERPIEEYIMKGVINLDKPAGPTS  
HEVVAWVKEIFGLSKAGHGGTLDPKVTGVLPIALEKATKIIQTLLPAGKEYVTIMHLH  
GDVDEEELERVVKEFEGTILQRPPLRSVAKRRVRPKKIYYIDILEIDGRDVLMRVGCQ  
5 AGTYIRKLCHDIGEALGVGAHMAELRRTRTGPFSEENAVTLHDVKDAYEFWKEEG  
WEEPLRHVVRPMEEGLEHLPRIEIRDTAVDAICHGANLAAPGIVRVEKGIQPGDLVAI  
FTLKGEAVALGVAKATWKEMLHADRGIMVDTKRVLMEPGTYPKAWGLKTPGE

<SEQ ID No.:0134;PRT;Methanopyrus kandleri>

10 MSSRLTLVIAFVLLIAVSPVHAGKLVITGYWSTGMPAAKAASGLPVTVIVEDTVSKGF  
VPEEHVREAVESADTLLLIHTTSNTVFGNVNLNLFSESSSEKRVFEFDNVLPGPSEV  
KSLDSVKVNWYGLEIPLSLYVQSRSVRNFRSLFSYFLERHPGPYPHFDGWVEGYDF  
ERDEVIRPSDPNPGEVMTLIERYGDDGVILGNTRYPAWFVELLRKHLDPDIIIEVLSKE  
PRREGPTVLVIVDTTRMESGWTAPIRELCKALRERGLNPMVLGLHYDILDGCLEDVL  
15 LALKRIVSEYNVQTIALLPGFFKMRSPDSPEVELLKELNLPVIKLVSLPWTMSEWQTC  
WRTPSGLDWFALYHIVIPENLGAIEGIPISVREWRKDGPEALLDRVWCSDTPVPPEMI  
RIAADRILAWIELRNTPNREKRVVILYWAAEPGKEGVGTASSLDVPASINFLAWLM  
KASYRVEIPEELKEKLLFEADEIPAEARGLSIEEMLLRIAELEERAEELAQEGRWKEA  
LDLYYKAYRLIRPLADALGRMLVEEGSNVGAYILRRVNVEGHRLVRLLAYEHGRFV  
20 EREQEIRYLHLLPLDEYLLKWRSLPEEARLCMEKGIFGYLEAVLLQIKHGPITDPLK  
LQAIVNGLSLVSYVAGHLQYLDVPEETKEQFQRDVESLVDVIGALTDPKEVNQAL  
ELCRSLHAKWGRVEAFYGWFTGWGPPERSRYLVEIDGKKYFVIRGIDFGNVIVAPQ  
PARGYYVGISVAYHSTVLPPCHYYLACYYYFTRVFRHVIVNTGKHGTYEWLPYKPL  
FMSWWDFPQICIQNVPPQVYPYYVADPSEALVAKRRGWAVIVNYLPQSLVKEELTGD  
25 MGQLELLERYQSSHLSLKPAILDLVKKTRAYELLNLSSLEAFERKFDENCAKLYFL  
LHDLLEEHEVVPIGHLVFGMPPIGEDPVGTVASFAAKVLLNEVMGALDYSRALDVCR  
EVIERPETRDADDLHREAARIVELLFESARLERTNFLNALSGGYVPPGFNSSPFKQID  
ALPTGRNACMFDPKRWPDWISINVAYTVAIPLRTVTRKVAFDWDATDNINTRGLPIA  
VQMLLLGVLPHRNADWVVTGVDPSLCMNPSGVSYTRRLGQILVVGRIVRMESLGS  
30 GAVRLVLEPPMGGQRIEVRCPVNVLPILPHLDDEVMLVGLTLVSTGGRVEVVNARVL  
SEEEAKRIEDEVLTPTQLSAVGRAFGRPLIRGRVERVEGRYIVLTDGCTEVRVRIDE  
GRVPEEGETVTVIGTVTLVGDEPVISASLVREVPRRLTDVIVTGTSCFRDVFHNL  
TEFLGRVAAILAAEPYLARLLSHSSLIVSDVDKVLIRGIDEYPVYVWRRWLRETVE  
RLSQGEWKNPIHETVLHVYRAALWRALTTPDEELARELEEGLRRLYDLVGEFCAEH  
35 GYDFESVVNTAASLAVLVPPAENYPFLDWAAYVLALLTCRESNITSAPDAGSGGSP  
NGGIITGWIEQVREVPDEDLPLLAALNVFCQAPGDYTNVIGKTIESGEFLLEDRLNLA  
LSWISGLSYVYGPKHWGASFPLLLALNLAAPDRTLHTMVSSDEKATFFYDDCIYAFE  
GGLRLAVSAVNGLLPEQETMIDALVLNLRNAALGSYVGGDYSQMARRLAEEIQLMA  
AANPNLAPWLRDLASQLSAGSYLAALLASNMTSLFSTVTTRTLALTGNETAAFRYS  
40 LLMPFDTYAWYDLMRTVFNVPVYVRGLRFHGYSGAVELLKRLGYLIRGWSTLALGLL  
GWEGIFRRTASTLVENREWLARYSPEGLFSLAVSLLVIAYDRAQHKLISEEVLSRE  
FVALVRDVIVPELLRGVLCCCPGVCNPNVQQRLLEALSQYEGLVPNLREAMAVFA  
ANYMNNPELVARILRQLTSPAFTRETAPMAARTVRTLAVRATASQAVAISATIAAILA  
SQAALSGPGRGAVPVSVTVGLLRGTGAKSAATVEVSVGSSAGKGKPSQERSARA  
45 SILRRTSAQSPVTTSVPRWILVALIVALAAILVGLWLRPRIGTSRGW

<SEQ ID No.:0135;PRT;Methanopyrus kandleri>

VRQLLVILCCVTAIGPVSAATLEDADQCLKDSVWVLVENQFTEQDVGKTYTLRDPG  
GTYNKGQYEVHFATEQDGLQDEGVASRDFTVEDVDVGTWPTTYKGD CRVIYVKK  
50 YNYFPSDYGLETVKLGDKIVALIDNSKCVIYVKKNDKYGYVGFGGEPGYSDTKFTVP  
MLVLAVEEGVTDEQFKNVKAIRKWLTVSSPRGYYYQYSLKDIRTTLEESGYIRTG  
SIGGVCLYQLIPLLVGRELGLVDDDLWNSVKDDAVYVIKNGILVPEVYCSSKQDKKD

VLIVDSKNEIAYWVRQRLKDDTWVDYSAVYDTAGAVLTLIYAVKTGLISGDDDDVDVG  
GSTYKVADIIFYAVNFLVERFYEGNGNPCFLEKQAVEQGLYWKSYYPVKYAFYAL  
WAIREAEKAGYLSDKAKDLLHDALRRYVCWLYGMQLEDKPGYFPYNEYIKGSPDFA  
STCAALLGLCTAVELGYEDDMAIQLMKNVVALVSQYKEAKEKGLKYYFYVPTPQS  
5 YYYLYMSRFFEGREANQCAFATAHVVAALAAVEGLPESVRSEIFGHTVELKVEVPR  
ETRVGTPVTIQIEVTIDGQPASSGEVRVYEGDRIIGVADVSDGKATITYTPEKRGEHR  
LKIEYRDPKYGVKSTTIVIKAKKKAPAVSPAVALSVLALALRRRP

<SEQ ID No.:0136;PRT;Methanopyrus kandleri>

10 LSEVPPEEFQKDVEEIKRRLREGELTNLGAALAVVLLASLKGQWINVDEIVRVLKELGY  
NVKANSIRSALYKVRQEGLLKSKRLGRKTAYFIPVDDDET LGAILRRVTGEEVREKIV  
EELLEIIHGD

<SEQ ID No.:0137;PRT;Methanopyrus kandleri>

15 WVAVAFPWSLFSEETDPKIYAYRVGTLARALAIYRVVEEVYLYGDGVGTRRNAERLRK  
LLEYQECPPQYLRKRVFRLDRDLRYAGVMPPLRAPHHKVHSPKEGEVREGYVVRRS  
RNGALVDVGADRLARTWRFRKPHERVTVRIVSEDPLEVEPAEPEEYWGVRVIVN  
ELNEVLREFKEGIIVTSRYGEDVREVEFKSPVKCLVFGSSEVSVLDVDPGVRDEYPV  
INFVFNQGVQVVRTEEAVHTTLAVLNLYGLI

20 <SEQ ID No.:0138;PRT;Methanopyrus kandleri>

LRVASGLEPQEGYEIGVVVDALRASSTIVTALALEAEIVPLSSPEELKRVDGPTIGE  
QHGGKIDFADYGNSTDLLRHAEIEGETLYMVTNNGTDTILRAAEVHEEVLIGSLLN  
ASAVASKLSGDTCFVEAGHRGMLAVEDTYTAGYIARLAGGEPADGRTRAAMEMAR  
25 GLPAEEVFKGSRTGHVLEQRGRLEDVEFCARVDEFEVVPVYEDGMVVPQ

<SEQ ID No.:0139;PRT;Methanopyrus kandleri>

30 LLMDRFEMFGSELYVLRTAHAGVDGDRVRRKILELDPEAVLVELCEGRLLSFLAELR  
GERAGSRTGGITGRLVAVAERIVGRVVGELGEDVKGAIEAALEAEIVPVDMDIS  
WVFRRMKMKASRWELLKFQFSVAIDVLRSLLRPGQTRDVVLSSVADEEAAREMVQ  
GLRRAFPRIAEVLIDERNRVIAENTIEFLHSREDVTKAVLVIGAAHYGVLDILRDAELE  
SASRHDDDETASGEGEEETAG

<SEQ ID No.:0140;PRT;Methanopyrus kandleri>

35 MRVLFLGYRYGSRAAENVGSRSDFDVEFLKVKEPPENVILDEEYARTLLPPSYSGF  
DLVISYLQHPDLQLALAEVCDSPILYGITPDPAVREKIERSHDAVAFPETTMCSLLPD  
TGIPVDRFAERFGRPKLEVSVSGGKIRTVRVVRGAPCGATWVAAERVEGMSVDE  
EAVNAFALAACHHCVAPRFGKFESKDVTAYLHGVALAEALGIELDVDLEGFELPI

40 <SEQ ID No.:0141;PRT;Methanopyrus kandleri>

LPGLTALAVLELLGTGFIAGYLGGIIGTGGCVLMLPMLVFLLYKPIPEAIATTVFVAVW  
TATFGTMSHAKLGNIDYETSAIVLAAGAIGALLGSVIFALIMKHTGALQVILGAAFLYA  
AVRMIYEWIKKIPGSEADEIPGKPSSKAAIGFGIGILTGILGLGGGYALVPSFIYLLDAP  
VHLAVGTSMISMIPMATVSAAYKMAQGLTDLVGGTLLGLGTIAGVKLGAKTTQKIKP  
45 WTIKGIFGVVFLYISLKFILQGLGIKLL

<SEQ ID No.:0142;PRT;Methanopyrus kandleri>

50 VPRKILVPFDGSEPAELALKWALLDAHDHGFPIKVMYVVDRLDLLTGFAPRETVLK  
ELKERGEKILEEAEQIAGELGVDVKIEKKVCVGIPWREIVREAEDDEEINLIVMGSHG  
RTGPEHAILGSAENVIRHSPVNVLVVKREKRVEDSVEESSRR

<SEQ ID No.:0143;PRT;Methanopyrus kandleri>

MIPDPSMMLYLIGIGLVGLVSGMFGVGGGFLVPLLNSTGMPMHLALGTTLLAISLG  
 GFTGAYRHLQEGNVHVDAAPIFGLSAIVGAQVGSYLACTPEHVLKVALGVACSAM  
 ALRMAFDGETEEGNEIRDNIASLTGFGVGAFSGFTGSGGGVLFVPVMASVLNFP  
 TMLAIGTSSVIVPVSAAGAAQYWMEGYVNFWAALAVVTGMLISSYVGAELSNKIGG  
 5 ERVKRAFSVVLALVGAKMVLGLRLV

<SEQ ID No.:0144;PRT;Methanopyrus kandleri>  
 LRSRRGFRALPPGPRPPRTPDDPARVIEDKIKECVRRSGHPRPGSRILVAMSGGKD  
 SFAVAFGLKRLEVGTGGRVAPTVDGKKISAWDVVEEQAKILEIHAYLLEPESDVLEL  
 10 KEEMNARKVCYACRTLRRIELGQLAEEKGFDYIALGHTLDDAAATVILSLTGAERLK  
 LLWYTGTWRGGPRLIRPLVRCPEAVTKALAEELKVDVTMTEDVCPYAGGLRDEVEE  
 FLDRLEREWIPHVKGNVGTALRTLGRQCH

<SEQ ID No.:0145;PRT;Methanopyrus kandleri>  
 15 VYVVGVDLAAKPGNPAGFAVWREGEIVCWSESSDDERVLEVCRKAELVFDAPLT  
 ESDRPFRRRDEIFRRYAPVLPLTFPGMRELSRRARSLVRRLELEVYETYPRAAERFI  
 RLHGNPVDEHSRDAAICCAVGLAVLEGEAHVFGEPPKAALPKRELSVSVRALTAPP  
 DV

<SEQ ID No.:0146;PRT;Methanopyrus kandleri>  
 20 MPDKAEVFFDEGVLDFAVDVDEIVLDVGEEALAEALAHRRHRMIVFQGDEGKAEAAAG  
 VVTAGAADVLFDRDRPISVLVYTDLSLKEDTYARERYEEFRRVLEGFAEEANFEYEL  
 EALTFSGSKRALGTTWDLMVIDLSYDLPDAIGRLVETVRGGGLVIFQTPPFDRWR  
 NMWTAfhKSLVTPPYTLDHVGKRFNRFRIRKLKEHDGWVIVDTDEWTAPEPSED  
 25 VDLEVEVKRRERPDLDPDDAVLPEELYRMCATEDQFRALIRFEELLESNGKTALIL  
 TADRGRGKSALLGIAVAGAGVTTDVYDVVVTASEPENAVLFEFLLEALRELGEYD  
 VERDDKGNIVYVETDDFVVEYERPSEASEIECDLMVVDEAASIHVPILERILDNNDKV  
 VYSSTIHGYEGAGRGFSVRFLQNVKRKRDVRLIEFKMHEPIRYDSDDPIERWLFDTL  
 LLDAEPADLDKEDLECVKEMRVEFEKPDRLRYWFEDPEGEEELRQFIGIYVMAHYRN  
 30 RPSDVMVLADAPHHEAYALKTETGKIVTALQVAREGTIPRDVITKMRRGYRPPGNVI  
 PDLMVQHHDALDFPRMKGLRIVRIATHPDIMRHGLGSRALKELAKIAKKDYDWIGT  
 GFGANEELTRFWLRNGFVPVHISPNNPVSGEYSVAVIRPISEEAEIINRANFEFRI  
 KLADWLGETHRDLEPEVARLLFEPMSLSRYRPTLTEGQLRRLKKYADMVHTYEIAA  
 DAVRELAKAYFLDTEDRPELSEEEELLLITKCLQRWKWADVADVLGEEVPDLMRSL  
 35 RDLVGLLYEEYKEDLQRSAAVEGIRKAVERLADKGLTGTVIVEVEEGEPKEVIIRREE  
 RLEL

<SEQ ID No.:0147;PRT;Methanopyrus kandleri>  
 40 LTRLLGGPGLTPRIMVGTSPFLGAGQFGHRALLYRRTFYHRPENIVALLEYCAEELG  
 VTGVQALADPVIIGALRDADPDLDVAVVGLRNLEEELEMLENLNLRAVLLHASCVD  
 GEDVGEVSAKLDEIRSRLDVPVGIATHRPDETLPWEDKKTADVVMVPLNPVGAFM  
 GDQKAVEELLAETDRTVIAKKVLAAGSLPPEEGLPYAARYADAVAVGITGKKEAEET  
 LRIAKRYFG

<SEQ ID No.:0148;PRT;Methanopyrus kandleri>  
 45 VPVVHVGLFGHIDHGKTALAAQLTEKPSTAALDKHPEEKERGITIDLGFSSEFELGDT  
 VTLVDAPGHADLIRTVVAGAEIIDAAILVAADEGPQVQTGEHLVVLNHLGIDRGVIAL  
 NKVDLVDEKTVERRIEEIKRVLQGTTLLEDAPIPVSAKIGEGIEDLKDALLEVLEPPNR  
 DLDSPFRMPIDHAFHVKGAGTVVTGTVLTGRVEVGDELTLPIGKTVEVKSISQSFQK  
 50 DKQEACAGDRVGIALRGIREEEIERGFQLAEEGSLRVTRYLDLKVEIDPLFPQSISQK  
 TMLHIHVGMRSVPARIVPHDDGFLDLSLRPGESSYLYAKLNEPVAVREGDRTILVKL



DLPPTTLRIAGSGLVEDTSKRETFKRVSRRRGRVTRADHMGKGLAVVDGLALNKEH  
AERLVGEKVRTEGGVEGKIVDTHGTRGAVLVDFEGEVKTGERVVLERVRDVKIDL

<SEQ ID No.:0149;PRT;Methanopyrus kandleri>

5 LNPATAELWYLLVLAFSYGTAYLIVACEGPRYLLASGVVLLFINVLLWIHIFDTKARN  
GSPPTGAEIVRVRRALKLSFAILGLQFTGIASIPGLLMAFTALRRKVIFYFMGITEFKAL  
VYGTIALVTLPCVIALRKRHYHWVLMGMPIDTVVSVRNTFRRVCAIDAVLPIPIVVAY  
VLLAKGGLGGEDIFTAAAVAGASSLNFNRAKVRYFFDEGW

<SEQ ID No.:0150;PRT;Methanopyrus kandleri>

10 VAKYEHMMMECLGKTPVRVIWKDGDVEVRAEGDPMIERCPLMRRREGFSKLTREAA  
ERHVLNKVNEVGMFTPKRRIRSCRRYTPFGVSETLMTCLQHRLLIDAAVIVSDCAGTV  
VTDKPAIVQGLCGEISGIRDTDPIPEVVDRLEDSCSVLGRIDQREGVEIALEEGRRF  
15 VAVTVADAGDAEAIREEFGDDVLIAAVHTTGTDEEDAERLVQYCDIITGCASKAVRR  
AAGRRYILKVGSRVVYGITPAGAEALWLNVRLLGNLKLVRHLG

<SEQ ID No.:0151;PRT;Methanopyrus kandleri>

20 VSSPDTPSCAHTSPPRHPPGDDVPLRLTPIGWVVERTDEEGLVKVRERYRKCLEGL  
EGFSHWILWWGHEADRTVTRVRPVHGEVPELVGVFACRSPDRPNPVLTLCRILE  
VRPNSGELRVSGLDARAGSPVDMKPYLPGYDEPDGEVSVPEWVEMVKRGHRPP  
RTRGHR

<SEQ ID No.:0152;PRT;Methanopyrus kandleri>

25 LTEDVYERIMEIARRRGFILPAFRIYGGARGFYDYGPLGALLKRKIEEKWREYYVHKE  
GFMEIEAPNLLIGEVFEASGHVEHFIDPMTHCSECGEFFRADHLAEEELGVDAEGM  
SPEELEDLIREHDLRCPECGGELAEVTEFNLMFDTNIGPKEGRTGYLRPETAQAIFIQ  
FKDLRWARQKLPGVWQIGRAYRNEISPRQGVIRLREFTQAEAEVFFDPEEKEYP  
GFERYADEVLKFYPIEEQRKENGEMLEMSVREAVEEGMVSQPIGYFLGLTKRMLNE  
MGVPNEAIRSRQHLPEERAHYASDCWDVEVKLERFGWVEVVGIADRTDYDLKKHS  
30 EHSGEDLRAFRELEPKIVYRPEPVMKELGPRFKSDAPKIAEALRRITAESSEDELKG  
GLTVEVDGKEVEVPPECYEIVKEKVTGERFYPHVIEPSYGIDRILYCVLEHNFDPEEG  
VFRFPAPLAPIEVGVFPLLKRSDMVEYARRVARMMLREEGFTVEYDDSGSIGRRYAR  
ADEIGVPYCVTVDHETLEDDTVTIRDRDTTEQVRVEVDELADVLRGLIDGDLEFEEA  
GDPV

<SEQ ID No.:0153;PRT;Methanopyrus kandleri>

35 MLTQVALDLTSLPKAIEIAEASVEAGIHVLEVGTPLIKAEGSRAIERLAEFFPERPIVAD  
TKTMDVGALEAELSIXHGANLGCVLGAAPETIRSFVTRAHELCAALVDTIGVNPV  
DVL SKLKGLEEFDPDYLLHAAIDEPITGEELLHKFGVDRCPARTAVAGGLTPRKIEEL  
40 DGVDLVIVGGYITSSDPVKAAEAVVEAAGVEPYDFRPDEDQREALLGIRKHSTVGI  
VVKDSERVSEVLNAAIRLVWRNEPSLRTVGDGDDSDLVPKFEGDGRDLTLILGAE  
EFDREDLESIAKESVKTILVAEEHVLLKLYGVAEAVYEI

<SEQ ID No.:0154;PRT;Methanopyrus kandleri>

45 MELEIITEGRTPLKVPKTRGQPSARDPVFYNPAMQLSRDLTVSSLVQYGPKIVCDPL  
AGVGARGIRIAVELSPEVVNLNDLNPRAVELIEENVRLNDVEDVCRIENRDANALMH  
EDELAGRFDYVDIDPFGPPVPFLDAAVRTVRNRGVVGISATDVSALAGRYPRSARR  
KYWVEVERVEFYQEVAIRALISYIVRTCAKYDLAFEPHIAFFQRHHVRVIGEIRRGAR  
RADRALKRLGYLLHCRECGYTSEREFDRCPRCGSGSVRLGPLWLPDFADRERA  
50 ERAASDARELGLEEAELLETVAKETGTNPWAYDIHRWASRLGLSRVPSLTSVLEG  
LREEGFNAVVRPHYSKRAVVKTASPEEFEAVLTEVAGDSGCLHR

<SEQ ID No.:0155;PRT;Methanopyrus kandleri>  
VSEVKG RVIVNYRMGRHTQDPRQCIIEFEGVESRSEAAQLIGKEVIWKHPETGKVIR  
GKVVDTHGNNGAVRVRFERGLPGQALGTEVTLK

5 <SEQ ID No.:0156;PRT;Methanopyrus kandleri>  
LSKLAIEGGRPIREDPIPIAQPILGDEEARAVTEVLRSGQLAQGPRVEEFEREF AQFV  
GCEHC VATSSGT TALQLALESAGLPGDLAIVPSFTFIATANAALHVGADVAFVDIDL  
ETYCMDPRSLEEVVKLLKDRVLRPRTVAVIPVHLYGHPADMDPILEIAEEHDLVIEDA  
10 AQAHGA EYKGRRIGSLGDAACFSFYPTKNMTTGEGGAITDDGELAERARMLRSH  
GERERYDHVELGYNFRMTDIAAAIGIVQLRRLEEFNERRRENARYYLKELADLEPLIE  
LPTEKPWAKHVYHQFTIRINVEELSCTRDEF AEALRAEGVDCAVHYPTPLHRQPVYL  
RRGYHATELPKSERAAETVLSIPVHPGLSEEDRQDVVEAVEKVVSAFSR

<SEQ ID No.:0157;PRT;Methanopyrus kandleri>  
15 LPREKCPKCDGKGKIPVGETECPRCGGTG FVGVDISEHFKGAAQHAVEGYDLAS  
SRDVPCKPCQGGKGVITVYEECDRCGGTGYIVKCRECGKELDPDVEEDLCEECKKI  
KQIRKEKLPKVVLSPACGYEDVEEGELYKGKVS RVEKYGVFIELNDRTLGLLHRRD  
MGDKEPQDFSIGDEVVKVTDVRPEDGEIDFTIEGIDPRPDYREEVVEKELKRVLV  
HDIDESKIGETVLIKGKIIHVQQTPGPTVFTLRDESGSIWMAAFEGPGIRAYPDIEAGD  
20 YVRVIGEVTTHD GQLQVEILDMEKLVGTEKVEIKRAIDEALDREAEPEDLKPMVDS  
EIIERLWPRMREVAKEIKRAVLEGRPVLRHHADADGISGGVALEEAILPILRENNPDP  
EAEYHFYKRFPNKAPIYTTLEDASRDNLHALEDVHRYGHQVPLLVLDDIGCTEEDVPAI  
EEMKAYGVDVLVIDHHYPGEAVGENPEDGLKEFPIDEHVKVHVNPYAAGGDGKNIP  
AGVLAVEIARLINPEVEDRIKHLPAVACLG DHAESPEAEQYLEIAEEAGFDRKWLRI  
25 ADSVDFQAFQLRHTPGRHLMNDVLGTTGDEHRHRLVENLYKQHKIACERQLEAA  
LKG VKEYETDGVKVVTL DVEKHARKFEYPGP GKTCGLVHDLKVEEEGDDAKVVTIA  
YGPDFAVIRATENLGINLNDIVSELEEEMPEAAVEGGGHETAGSISFVEAHRNKVLK  
ALVEKILRDATS

30 <SEQ ID No.:0158;PRT;Methanopyrus kandleri>  
VRLRYLIPGILLAPSTTYLG YLAAKEVAYFMYHESVSIPDCELVIPKLGLRERINTTSP  
DYG VYYEIMTPPPGKKGITVFYGHRTLFGSPFLHDELKRGDKVIVYWFGSKYVVV  
YDKVVVSPDYVIDPDASNKDELWLVTCTPLSTARERLIVKCVRVG

35 <SEQ ID No.:0159;PRT;Methanopyrus kandleri>  
LKL SLKSTILVMLGMCVAYSALVGSITIAQTGQSPGAPVGQPTPTGQ GKPPVTISK  
LVIEVQATGKGAQKPRESDIGISGAKVEDVKISGSRAYAKIVASNVSLEEGFPLMVNA  
GWPFNMSECSYERISVSMELKANVNSAPETELSGVVVLADGRLVDADPKPARVND  
NVPVWKIGVKDGRVTIDGRPYGPFPEIRYVMEYSRGAGGPGAGAE GGGAGGAAG  
40 GAGVGGAGGAGAGGAVTAGQYKAGESLFLIAAVVLA AVVGLYLVYRGLSK

<SEQ ID No.:0160;PRT;Methanopyrus kandleri>  
VIGAIVIGLIFLAAGGGAYYFFVYKPYVEQLEKLRAQKLKELNTYFTGPLAASPTRTKL  
QQQILSAETPEQLQAIDVVG AATVEWRRYLAKQIKMNQKKGRVELVTPEGPQLLTV  
45 RDALNKIRMMGVDEL MKVQVKRPETVLIAIWADPNKTGPIKVGDRVTL SITNWALKKI  
AKVKNKEAYKGP NQISGAIVRYIMLIKGLPDNFKIDLVSASALETMYRTGSSDLALR  
KVVFPAGLV TGRSYAVGGGTGV TYTLKNYPGLNTRVTS PHLSPVALVDLRDLVKAM  
AVERARRGGGFIRQLMSIEAREGIRSWENLLVIVEIPKDAVQPKVLIASSVKGGIWILP  
ET

50 <SEQ ID No.:0161;PRT;Methanopyrus kandleri>

5 VERWKISELITPACVVSLTNVVFAGFSLASIAGFPGAAARFIILSFIADSLDGFVARRT  
GKESEFGMNLDSLADLVSFAPAVLVVVTAGLVPAPMCYLLAVLMVCCGALRLARF  
NAMCVDGYDPGEYYLGLPVPWVGTIASSLYFLTVDLGPSYLWYVLNTVILGTSALLM  
ISSIKFPSLKRPHPAILAAGGLSSLVLLFSFLIPPDEIKRGGLEVVASVTITALLSWYMR  
GVRGCFRGR

10 <SEQ ID No.:0162;PRT;Methanopyrus kandleri>  
LMAPGWWKFVTPPAALGAALFPWSRPLSFLCLGTAAFLAFFFRNPPREPPSDPSLA  
VSPADGRLLGYVMEAGEASDDELSSYLDDPITVSVFMSPLDVHVNRAPLDGRVVEA  
EILKGRFRPAFRKDSATENNRAVLLFDGDPPFVRLVSGAVARRIDLTVQEGDEVN  
KGEPIGMIRFGSRVDLAVPRSSVEELLVRKGDsvKAGETPVIRVKR

15 <SEQ ID No.:0163;PRT;Methanopyrus kandleri>  
MSVWAFVRKALREPLRVGAPAPTRRETAEFMVRAAGVEEGDFVVDAGTGNGVVAI  
AAAEMGCEVLAVDVPDPEMIDMARRNAEEYGVEDSIEFVADARELPELVDNVDVAVL  
STVPVKTVPEPLEFLRSCATVLKTSGRFVQLTHWPGYFTKLLHHEVPLRVLEKYLK  
VWHIVPGFVFCERV

20 <SEQ ID No.:0164;PRT;Methanopyrus kandleri>  
VGVREVLRRLAALRSGPEELDIGIYGAPNVGKTTLANRIAQDWEAEFFGQVSEVP  
HETRESVRREVAIEVGSTTVKFNIVDTPGIATKVDRKFLEYGLDVQEAQRAKEAT  
RGVVEAIKLLKDIDGALVVIDSTKDPLSQVNVTLIGNLEANDVPFLVVANKIDLEEADP  
EAVRKAFSEYPVVAVSAKTGENMAKLYEAMVREFTS

25 <SEQ ID No.:0165;PRT;Methanopyrus kandleri>  
LTDGEVKVEVLAKSALERMSTEEVVEYVIEKTRGGSVIVLEGQLDPETLTQIIRETME  
NVDLEEFTGVDIYVPPKAKTDKGLFDRLGRQSEEGMTVISPADVLKDMKKGKDFI  
TLKLG

30 <SEQ ID No.:0166;PRT;Methanopyrus kandleri>  
MPHICIRCGEVYDKVTKEIIRRGCLKCGCRLFKRVSEDDGDNPATIVVERDGVYTINI  
ENIDDVTVYKSGRFFIVLPEQKYGD

35 <SEQ ID No.:0167;PRT;Methanopyrus kandleri>  
LKTTERPELVRKILRAAAVSHEDISKEMDSYCAILGDPESIDDIVYEMRLSNFEIIDN  
SIVKTRHGIVWRYGVVLIKSTPEITSLIKRIVSDTNLMSVVFKAkdGNFLIAGPDIVLK  
KILSSARVKMKVKVTKRTRGIAFVETSTVFDAMPGFLKDIINTLLGIEEEVFSILVLDV  
EDPEKFKKIIDKGNVYWRRIEEDKET

40 <SEQ ID No.:0168;PRT;Methanopyrus kandleri>  
LPLWKRKKKEETKQEKKIEEEKKENNEKKASKLPTSIEQALSEEPEIEIDEGLEALGID  
LGTMNTVVARPAEEEEFLVKQFPSVAVKKGTNRVLAIGEEARRMLGRTPEDIVAVR  
PMRHGVIESLEYAKFIVQYAIELGSDNSPEEIERVAVGVPGDASEVEREAIEEATSDV  
GMDKDNVIVINEALAAAIGAGLPiAEPDGTmVIDIGAGSTDIAVISLGGITDQETMRVG  
45 GDNIDQNIVDLVEEEFGVRIGIHEAERAKVEVGKVFTETEDIEDKEIEVVGKDIETNKP  
KEITIDSELVAKAAEPVQEIIRAIESILDRLPPELVPGVYENTVLVGGTSLMRGLRARI  
EEETDVPAELVDDPLTVVAKGAAIVAAEPKtlePEIRLKALK

50 <SEQ ID No.:0169;PRT;Methanopyrus kandleri>  
LRLRADLHHTTVYSDGHGTPLENVLAEEERGLETVALTDHGPASPDGLTDRSFRRRL  
VAEAREAEKLCSVRVYVGVEANIVSISGEIDATPAMLSESDIVLAAIHNPRLILANPGS  
AEELRRAIVHATIRCIESGEVHIAHPVWILEQLRCYITAQEAEEIARVAADHNVGLELN

ARHLPRDFTLYQVAIRVGAPITFGSDAHAPEEVGRFKPLQKLARRLGIEPQDVHPEE  
LGIV

<SEQ ID No.:0170;PRT;Methanopyrus kandleri>

5 LNPPELAAALPYSGCCDNPREFLKRLEVRSDPISLALVEIHGRVARKVQEWKPFVCPD  
IRAAREFTREIVAKAKADFLAERAGGSEALDLCAGPGGDTLALAEHYDVKAVDREVP  
RIEALKINARLHAGHAVEVIELDVMEAELEADADVHADPGRSGAKDPKRTEPPATELR  
DMFSEVPHMIEVPPAVKPRPGTVVFSATGEVRSVCWTNLTEKVAAVIAETSAVLEG  
10 LPRKPTEALEPEEVRYVIEQDPAVRKANLSWKLAEEELNVHPTVVAGEETVLASEDP  
DLTVDHVIRVVEVGEEGDGPPTIRSLGVKLNPRRLAELRKTYKEYDIVYVTKAGVLA  
GKVIYERE

<SEQ ID No.:0171;PRT;Methanopyrus kandleri>

15 LLEAAGAVLLGSAALLMVGR LGNRGFFLWLRTVGILGLLVGILSLALAALTGSAIAGL  
VVGIVITAAAMMYLFSSRIVRIQMGAVDAEEFLRYKPEYADKLRRVQEMVSKLASKAGL  
PEPELVVPEETGVGGYPNAFATGRRSKPTVGVTEGLLRHLDDDEIYGVLGHELAH  
VKNRDTLVMTVAAAVSTAIAAYAFDPWLNAMYTEDWEDIAFLVLAGMLASLISTLLVA  
AISRSREYLADEEGAKLSGNPMALAEALEKIEAIVKSNPAPARSLSEVSTAHLWIENP  
FRGGLLRFLFSTHPPVEKRVERLRRLARELQGP

<SEQ ID No.:0172;PRT;Methanopyrus kandleri>

20 VLRVLLIYPRSLRYFVIRAYRELPSTVKPDSVLLASCDAVRATYTRLEGNVVTVEIG  
AARNFQEVKASLAHELAHV LQFEHGVMPIGGLPPLRALALPLEVGAEELVLQELPDV  
AVRRLEMGLRRVTGCRTDDPLSELESLVLEPLRLAAERLDVPLYVPEVEPEHPEV  
25 AKVKKRLLRRVRRIDPWSPLEVQRYLEDAAEVTVLATLSRGA

<SEQ ID No.:0173;PRT;Methanopyrus kandleri>

30 MALAKRIIPCLDVKDGRVVKGVFRGLRDAGDPAELAHYYRHGADEIVFLDISASP  
EGRRLMVDVVRRTAEKVFIPTVGGGISDVEDFRALTAGADKVSNTAAVENPELI  
SEAADIFGSQCQVVAIDAKREPLKPEHEHVADHIFSNDDGEYWFRVYVRGGREPVD  
LDAITWAKRVEELGAGEILLTSIDADGTQEGYDIELTREVCNAVSIPIASGGCGHPK  
HMVEVFKEADADAALAASIFHYGKFTIEEVKEHLAERGVRVRQC

<SEQ ID No.:0174;PRT;Methanopyrus kandleri>

35 LDSIEKYLLVTRRMVNAGIPKDRALNTVQRTWGLTNREKKALYRIVWSRLESLLRAG  
KRVPTPLLRGQDLVIDGYNVLVGLASLDAGEAVLCDDDVVRDLRMSPKLEEEVQT  
ALEMLETYLRRVEPRSVRILFDAPVSGSGELAAARVERYLKDSLNVPRASAVKGVD  
EKLVRAGQVPVTSDSGIIDRVSAHYDAVREVAAEGIAVWIPPGPSEPKFVRALVPE  
40 G

<SEQ ID No.:0175;PRT;Methanopyrus kandleri>

45 MVRRTSEEISERMEDYLEALYLLSRGSGRHRVRISELSEYLEVSKPTALEMIRKLAB  
RGLVEYERGLVKLTEKGREIGKEVWDRHREIASFLRFLGVDPKIAERDACAIEHSLH  
PQSFRRRLRKLFHLLKEATGEPTVREILDKVRGEEGSDGVRHRS

<SEQ ID No.:0176;PRT;Methanopyrus kandleri>

50 VKSWYGEVLETVDDAENFFERELRRMHKVELEEVPKVVFCAFDVIEGVKHEFEPEK  
YLYKPGAIPAGAQAALTLDIMTDDHREDAVYIGEPGPEVSRDRWAGRVVSVLARLLP  
ECVEVGILLEDVRELEGVRVRIGKFTLLNYVTGAALALSGAEVELEVQ

<SEQ ID No.:0177;PRT;Methanopyrus kandleri>

LDALLKICILNALAVVAFAVLVWAAFRYALPSWFIILVPGVLGSACVDYVMISVGVY  
DGPWETAFAVAVAWWTGRPGPSGPGSR

<SEQ ID No.:0178;PRT;Methanopyrus kandleri>

5 VAEIKIHPLTRVEGHGEVIEVEDGEVTDVKFAVLAVRGFEKQVQGRPAEDVPYIVSRI  
CGICQTAHHLAACKAVDACFDAEPPEGGHKIRWLMHIGNMIHSHALHFYFLAAPDY  
VVGPDADPLQRNVV/KIVKDDPEVGKIAIELRRYGGQDIVEATGGKAIHPVTGIPGGVSS  
PVDPESTRDILLNRAEEMIEMAYEGAKVGEIAIKETLEEYREKHDIDLLETGNIETYH  
10 MGLVSDGDKHEFYDGEVKVVDPNGEVTRFEPQEYQDVIAERTIEYSYVKHPYLKD  
VGYPDGIYRVGPGARLNVCSMKTERAQELYEEYVDEFGEVCVNYSLTNWARLVEL  
VAACEEAKMLLEDDVITEEDECKEDYEPAKAGEGVGIVEAPRGTLIHHYVTDDEGRVK  
EANLIVATTHNVPAIELALKETAKKLEDEIVELA

<SEQ ID No.:0179;PRT;Methanopyrus kandleri>

15 MGKATIATAQLSSCVGCHVSLDLHEKLLDLLEDAIEIEYCYVLVDQKEIPEHVNVAVI  
EGSIRNEEDLEVAEELREAADIVAVGTCACYGGVHGLANLYQLDDILEWVFKETPT  
TDDEGETPEEVPELFGYVRPLPEVIDVDYMLPGCPPKPESIAEVITAILEDREPELP  
TTNLCEECPREKEDIPIEEIKFRTGQGRPDPAKCLLEQGYPCMGPATVAGCGAACP  
20 SRGLSCRCGNGPTKQALDQGAFLDAIASVSFETDVDVEEILEGLVDLPGLKLYMFS  
MAASLLKGHRDVIFGSKGE

<SEQ ID No.:0180;PRT;Methanopyrus kandleri>

25 LIPLWWCAVIFYAMAAIPVGLGALRIRSEGRKTILVGLLAGLSFVFMQVPIGHAHVNL  
GPIGILLGPWSSAVAVFIVNLACALMGHGGITIVGLNTLINWGEAAGVWALYRLLRER  
LDYGAAAGIATFSVLATSSVIPSFVMAVWINKPVLPLLLTLTTVWIVTAIEAVITASMV  
KALAQMKPDWVRDL

<SEQ ID No.:0181;PRT;Methanopyrus kandleri>

30 VRFTEALEWSLTAETVLHRIHPWSKLVGLMTTIFASMLLYDPESIAILSIPYLIGCILAR  
VPVRILARLSIPPMAFLGAVLLLMLPSGVPGREVLLYAVRGATDLLAVLVTTLTTPFN  
ALWSALVVFPPTLAETGLIFHRSVYRAFELEGTLNAIRIRGWRLRSINVLGSVIATL  
LIRSHRSAELVQVSVEVRGATGRVRPLKRFEFTRIDFGWLTMVFCVALSGVV

<SEQ ID No.:0182;PRT;Methanopyrus kandleri>

35 LTHEYDPDGTCAVCGLSLRVKEGESVVVLGPNNGSGKTTLLHHILGLLTPTKGHIRVLG  
HDLPDGVREVRKRIGVVFDVDDQLIMPTVLEDVAFGLVNRGMPREEAFERAREIL  
ERLGIEDLEDPRPPQFLSGGQKRLVALAGAVAPEPDLLILDEPTSGLDLFRATRLFVRLI  
RELKEELGFTMILTTFDVDIAAALAERVVIREGKTVAEGSPEDILTDVDLIRESGLKP  
40 PEHVELLRLGIENPPLDISEAEELLVAMLGEESRGNP

<SEQ ID No.:0183;PRT;Methanopyrus kandleri>

45 VETRKL RHPEVDLEGEVLLPVGSTEQHGHLPLGTDHLIAEALCREVSKRTGAPW  
YPAIPYGVSRHHMGFPVTVSLRTKTMVALLTDVHRSFLHHGAAATLAVNGHGGNE  
AALGTVAEEEEERFHWISWWKLAPIDELETDWGGHADELETSVMLYLHPELVGEERK  
VDGRPTKPWEFPDYHEISETGTKGDPRPATADKGKRIFKTVERLV DIVEELREMY  
G

<SEQ ID No.:0184;PRT;Methanopyrus kandleri>

50 VIWPDLTGLTARITGTTSGTHNVRAVRDRLWAGLMLCTNRRPVIALAYVEALKVL

<SEQ ID No.:0185;PRT;Methanopyrus kandleri>

MIRSLRTLKRAVVVNPLNPQSLRVLAVEVASDVVTAMAFSVRFSLLWIQCAPHGRD  
DAVEGAAGYGESLKGRYW

<SEQ ID No.:0186;PRT;Methanopyrus kandleri>

5 MSGVMGIDEAGRPVFGPMVVAGVLAPKRELGLGARDSKELTRSARRRLIRALMS  
DERLRVDLRVWPWEIDEEGVAKAEFEAIRELVRRAMPDEVILDKPGNYSPERLRRE  
LDLPEGINLIAEERADAKYEVVSAASIVAKTYRDWIVRLLELEYGEVGSYGPSDPRTV  
DRLRRELRRGGELLKYFRRSWETYKRVESEVKQRKLEDF

<SEQ ID No.:0187;PRT;Methanopyrus kandleri>

10 LRIAGLRPVSCSDGLPGEVCAVLWTQGCPLRCPWCHNPETRDPNGGKKADVETIL  
RDVEKYAVYLDALIVSGGEPLLPCEELKALARGARGLGLKVLDTSGFPPDRLGK  
VISSFDRVALDLKAPLRDDEYMEATGGGMTASDFLKAARIARRRCDLELRITVHPWL  
DDVPRVVEAVRKASPDVVVVQRYVGDKEVGIDPEELAEKLRESCENVVVRV

15 <SEQ ID No.:0188;PRT;Methanopyrus kandleri>

LNVAFEVKDRDVAGRLGRLEVNGRRLKTPALLPVVNPKNPTLDPREISKLGFDGVIT  
NAYIIRKHEHLREQALEEGVHGLLGDFGFMVMTDSGSFQLAEYGDVEVSNEEIVRFQ  
AKIGSDVGTILDVPTPPDAPRSRVERDLETTLKRAREAVELDEHPPLALTVQGSTYE  
20 DLRRLLCAEKLAELPAAVYPVGGVPLLEEYRFVDVVRVLAACKSSLPPHRPVHLFG  
CGHPLAIPAVAMGCDLFDASAYAIYARSDRYMSILGTLKLEELETFCSCPACTRH  
DPDDVREMEPRERTRVLATHNLYELRRVIETTRQAIVSGELWELAESVCRAHPRAW  
AGMVELARRGGELERWCPAVKRSVFCDEVSKGRPELRLYRRRLRDRFGELSGR  
KVVKGISRPYAEIVEWLEPWELAFADWLGVPGLSWSYPCCHCLVEPSGDDEGE  
25 DRRRGEEGR

<SEQ ID No.:0189;PRT;Methanopyrus kandleri>

VRTDGGVKRVAGAEFVLYKEGGSEFYVPDERYSQDGLPTRDAPVAFAPNAAVNR  
SVLVLFHRVRPVRRFQDVFVCGVGARAILHIEAEVEWSVLSDVNPIACQIAMINVR  
30 LGLPSEVRCMDAVAALSTFDFAVDLDVFGTPIFQAQAFRCVRDGYVHVTATDLE  
SLYTPAARRKYLLEGPLPRRDTLDEVRAVVGALARLAASVDIGIEPMYCLVEPGVRI  
RVGLECRRGRSRANETLDMLDYVDGVGPVWGGDLHDEDVVEEMLEELDCTGWS  
EKHARDVRKSLEVT

35 <SEQ ID No.:0190;PRT;Methanopyrus kandleri>

VEKVREARIARTLATQHPDATKFVRVQEEPEEAVECLVELGAEYMVDFEGKLTPY  
LQPIQVLMELYDAGVRVGEERFVIVRVPSATKENVLRQVQALLGVMEANSSELLKED  
PDARGIFEVHPMTSSPEELVETVDRISYARRFASRELDVPLKAGNLRRIPLIEEVP  
LDIRNLTGYVEGMREIGMDVSYLRVFIGRSDPALSYGHLPAVLACKLAIFEVYELSD  
40 ELGVPMAPILGGGCLPFRGHIRPGMEEEFVEEYAGTATYTVQSGFRYDHDREKAVA  
SIRINELAANDPLQLSGDDIEYLVLATAIFMKHYLSVFFRCIGTLNIVADMIPNTRDRL  
ARKGPVGYARDIPEPDRVGAQCKDLGDVGRELYRELRRMRVEKLPELPRAIKFTGA  
CYTVGMPPELIGTGRGLAEIEERLGEDALDAVISRLYPMLREDLQFAVEYTFLETAG  
SVLPSSGVAMVNTDLEYCVEYLDLEPPSDFEYQNLVHTLEPYLRYVVSEGGVEEVN  
45 PFVRDLLLEMGRMRGSLG

<SEQ ID No.:0191;PRT;Methanopyrus kandleri>

LKLTILASPLADRDVLRRAERLADRFNLEPRIVTDPEDVPDSPTVALVATGGTETIE  
ALLERSSAVLLLHWHSYNSLAAALEVGVSTLHVGRAEEAIRAFKRLVGTRILVVGK  
50 CSWIRGPDPSDLPYLQTVEDLEDVKSVDPDGSGFEEKLRAHGIDPSELNRNFDLA  
GKLHAVLSQYGANAITGDCFSLYEEFGAGSLSVLLRAGRALLRGRSRRPGHDPAN  
ARAYPSLHRKRDRAGSLRDASRPLCLPVGVA



<SEQ ID No.:0192;PRT;Methanopyrus kandleri>

LTVREVYEEELREVVLEKLGKGEDPLPQILGQREVKIQVLSALIAGRHVLIIEGPPGIGKT  
TLARAVADLLPPAEVVKGCPFHCHPKEPVCPLCRARDEDELETETIPGCERFVRIQG  
5 SPDLTPEDLLGDIDPIAALEYGPTDPRAFTPGKLLRGNRGVVFDEINRCPEKLQNAL  
LQVLEEQRATIAGYEVDPANFVMIATMNPHEYAGTEELSEVLLDRFDTVKMTYPKS  
KETEKRIVVERGEDFGVKVPEYVLEFIVDLVRATRDHDDIERPASVRATIGLYERAQT  
HAALQGRSKVELQDVIEVAPSVLRKRIKLSPRVQHVKSEEDVIKEIIQEVLEGYGKTE  
VPDTDGIPGKSKPDEGASTGAPEGRRRSRRWRPRRTQEHDPGARLGSEKRSRSD  
10 SRTVSRSESQKTSATDSAADGEVLDDEYHRRLLFRALTKEQQRKYVEGEPEYVFA  
ARVLRQLLNRGIEYIRPDQLAESLVTSAAYVKGYGRRFIEEITGWSYDEIASQQHD  
YSLIDELEEEIQRRLLEILQKLGFVRPSYQGGVSLTLKGRELAAFSALIEELEAFEGTEF  
GHHAARKLSERGTGSRYSREYRRGDPYANLDVRGSLRTAVRRGRREILPEDLRS  
FDREEEVCLDIVYVIDTSGSMSGDRIDAAKRAAIALAHFSVKAGDRVGIVGFNTKAEI  
15 VVDITSDVEEITKVMMSLKPGGATDIGDAIRVGTLEFRRCGRPDRDWHMILLTDGVPT  
KGEPDPETKALSEATAASRMGVTISTIGIKLPEEGIRLIEHIAGISGGRSHHITDPEELT  
LVTLNEYRRAKGMGP

<SEQ ID No.:0193;PRT;Methanopyrus kandleri>

20 MFPSVPSLRISPGVGPGRRVNPVMEIVKHYEDHPIMKKLKVRRDPFRALIQAIISQRT  
RDDVTDRAERFLRKFKTPKDVAEVNLKDLVETLRDAGLYRQKAKMIKECCERILAD  
GLDLEEIVQKPTTEEARRELMRLPGVGPKTADVLLFAGGHDVCPVDTHVARVSRRL  
GLTDSKEYFEVQEAVHEMVPEGERGKAHLALIQFGREICRPRKPQCELCFVRRFCP  
YGGEQA

25 <SEQ ID No.:0194;PRT;Methanopyrus kandleri>

MGRRIIPVHGFVELQGAEEVLDSPVQRLRRVRQLGLAELVYPGATHTRLEHSLG  
VKYLCDRVMEIHWEELKRNVPDVGKFSRSYIEEVGLAGLLHDVGHPPFSHVPEPL  
LEEELGVDHEDIGRAVAKVVLERADAMDVEVTLEVAFGPGDGWTGVLHSVIAGNLG  
30 VDRLDYLMRDSLHASVEYGRIELDRLHTELGDPVVVHEKGLEAAESVLISRYHMY  
RAVYFHKTCRAGDAMLLWAMHVAAEDGDLDLRIFDPDRLSRSEDALSAFQSMDDS  
ALLRALEENPESREFVEVLKNRRLKYCAVEYQAAVEPRHGELFKVAVETSEEHLGE  
SFGVLLDSSKVVPYDPSSDEVIVRTRNGDVPLSEVSDIVATLKERTLSEIPTVRVYVR  
PETRDDSRVRRIVEHVKSALPPA

35 <SEQ ID No.:0195;PRT;Methanopyrus kandleri>

LLSGDETTLTVYLARVLSCEPLFRVSTPEEARRIAEEKILSGEIEPPLEFFGLRRDAVNEV  
LAVTDGPAGENVAPVGLRVRGDSIVNLYPGSRTYENFVRTEELTACIVPDPIRFLK  
40 ALSKELAIETVGDGTVKVAEGTRAYLELEAKEIHEGKPLTAELQVVGWGLLHPRPRAL  
VRGESALLEALVELTRIHLDEDHVDACKRALEVVKRTIWSEEYQWAVEKVERELRG  
KEDGPDHQDTSPRIRRATGG

<SEQ ID No.:0196;PRT;Methanopyrus kandleri>

LVNEPERIAVSLTLGALLEVSSWPKPGNVHRTRDFDDTRFEHFLASAVAAQPVLR  
45 VAEMATRGERVPLGRYLYEAVRHSMASHTGGNTNLGILLLDVLLASALARASLDPS  
DVRREALKLAKETEERDAYLYRAIRLAGAGGMRRIRGSRAPDVSRPEDVLEKGIT  
MYEALQAAAHRDVAEDWVRGLERSLRIGLRVIELREEYDINEAVVRTFLEELATRP  
DTLIWRKHGFRVALRVSEAAQEILRIAGDRPVTETRALYELDRELHEDGINPGSTADL  
LAAGVGYACYLGMRP

50 <SEQ ID No.:0197;PRT;Methanopyrus kandleri>

VAEIVVRFDHRVIEKIPRRPHVPFELIGFIFSGWVLPSSILMLFDRPLGQVLEALVL  
SMVSSEILKVVVGRPRPQREG RTPWGYSFPSTHTARVASLIPVFWKLSSNLGIVVV  
VVAIIVASRVLSRAHYP SDVVAGFLLGYVVGWVFIW

5 <SEQ ID No.:0198;PRT;Methanopyrus kandleri>  
LKHSPWGRDGLYPTVRMRRYRKSEAIRDLVAETEV RPDDL IYPIFVREDGKT HEIPS  
MPGQRYHSVETAVETVRELLDLGLRAFILFGIPREKDPEGRVAADPEGIVQRTVRAL  
KEEYGDDIVVTDVCLCQYTTTHGHCGLVDEDTGKVLNDPTLEVLAEVALSHAEAGA  
10 DIVAPSDMMDGRVKVIREALESEG FDDVLIMSYAAKYHSAFYGPFRDAADSAPEFG  
DRSTYQMDPRCFRQAI RELELDAEEGADILMIKPAMPYLDV VREARRRFDHPIAAYQ  
VSGEYAMIKAAAEAGYVDYRTAVLES LTCIKRAGADLILTYFAPEVVRWLKS

<SEQ ID No.:0199;PRT;Methanopyrus kandleri>  
MRTVGYNP SLPHGECFKLIRGRKESRETA FGVDVFKEAFIKWSEGWARLKEFDRE  
15 EMLSAYSSFFRSRFGVNFKERNVVELLNLIYRIAVEYRNILDVGEKTLTGKLR TYFIPV  
IMVIMVKQFYGRIKRKEAMKYVRDALQFYKTAYELSGREEGFEEILVGSLLPIEVRKG  
EKLPKFFEEESFKDSTIRKFLGLESESGSVKFGLGCVFIPSWQFRELRAEIKFGKGFG  
RDGGYVEYV VHRAGTFRECLLMVPQLRLVLVENADTPDKRVFLPFDMLELVPPDPA  
ARMKLESLAVKLTRPS

20 <SEQ ID No.:0200;PRT;Methanopyrus kandleri>  
MEDLVCVGITHKEAEVEELEKARFESDEAVRDIVESFGLSGCVLLQTCNRVEVYAS  
GARDRAEELGDLIHDDAWVKRGSEAVRHLFRVACGLESM MVGEQEILRQVKKAYD  
RAARLGTLD EALKIVFRRAINLGKRAREETRIS EGAVSIGSA AVELAERELGSLHDKT  
25 VLVVGAGEMGKTVAKSLVDRGVR AVLVANRTYERAVELARDLGGEAVRFDELVDH  
LARSDVVVSATAAPHPVIHVDDVREALRKRDRRSPILI IDIANPRDVEEGVENIEDVEV  
RTIDDLRVIARENLERRRKEIPKVEKLIEEELSTVEEELEKLKERRLVADVAKSLHEIK  
DRELERALRRLKTGDPENVLQDFAEAYTKRLINVLTS AIMELPDEYRRAACRALRRA  
SELANG

30 <SEQ ID No.:0201;PRT;Methanopyrus kandleri>  
VSKSEAMAHLSVMEATYNVKIKNKEEAAEAIAEKAMEFGVEPIHICTALNTWLARMM  
SEGEIEEGDEIEIPRELIEGIEVKG

35 <SEQ ID No.:0202;PRT;Methanopyrus kandleri>  
MPRLCFVLAESELEFIPPKLRGHQHVVRWAKRRGKKPGECLLIASKHHVAMRDKRL  
PERDRRGRPDIVHVTLLHVL DSPASRENALDVYVHTRHDRV IWFVRGDVRLPRDQYR  
FIGLMEQVLKEGQAPPDSDEPLIEVL DVSVWDVLEANEVNVLLSERGD LIEPVGYMA  
40 GLLDAGVERIGVVGGFPKGDFSEEFYDRADDV VRIYDEPLDAWTVAARIVTAFELA  
AGILG

<SEQ ID No.:0203;PRT;Methanopyrus kandleri>  
VTSLVITDIDGTITGDDRAVHLKCIRYLRELQKRGIPVGIATGNTLCYSRSAATLLGFE  
GPLIAENG GIVAVDDEEISTVPEEDIELIQEAYRELRRRLGVRRTEPPGLRRTEVAIYR  
45 DVPIEEVERVLDGLGYSGRIEVDTGFAYHLKSKRV DKGKGLLVICERLGIDPDDVV  
AIGDGDNDAPLLKAAGLG VAPANATENVKRIADVVLDAENGEGVATFLRKLLEEVD A

<SEQ ID No.:0204;PRT;Methanopyrus kandleri>  
LKLYPLVRKVLKLLSSADSIGIMADTDADGVSGAATLCEAFGVAEDDVWFPSGGFY  
50 GVPKDALRDMLEDYDVVVTVDLT PPPFPEARDRVVIDHHPTDSHYPMTVNPYEIP  
ALPTHTSASALVGMLAHRTGGLNRPWVPLIGAAGDGM EGGAVYETLASMTDPGYL  
VPSRGRNLTP LQDAAATVNAARRVKYDVGAREALKV LMSADSPYDVTESHLQRYR

KRVRKHRAIWSGEAERTAHIVEGVGYAEIHTEVDVEGLVARDLVDRNLNLRCSVVVN  
LARKPCGLYKASGRSQGFVNELMVKMARWLEGSKAGGHPNAAALHFSDGDPRE  
AFNRALDLLQP

5 <SEQ ID No.:0205;PRT;Methanopyrus kandleri>  
VKFVVITGGVVSIGIGKITTASIGRILRARELEVTAVKIDPYINVDAGTMNPFQHGEVF  
VTEDGVETDLDLGHYERFMDVTLSGAHNITTGKIYQRVIEKERRGDYLGTVQVIPHI  
TDEIKSWIREVGKASGADVVLVEIGGTVDIEGMPFYEAVRQLQLEEGRENVMFVH  
10 LTYVPYLEHVHELKTKPTQHSVKELRSLGIQPDIVCERCERPLDDGVKRKIALHTNP  
REAVIDAHDVDLVYKVPLLLERQGGFDYICERLGLDADEPDYSDWLDVTRIEEADD  
EIRIAVVGKYVDLPDAYISIREALVHAGAHVGVGVDAWVDSEALEAGDSEAWEEVK  
DADGVLVPGGFGKRGVEGKIEAVRYARENDVPFLGICLGFQLVVVEYARSVLGLD  
15 AHSTEFNPDTDHPVVDLLPEQRGVKRGKGTMRGAEPPVLEEGSLLRRLYDDREIV  
LERHRHRYEVNPSYVRELEDHGLRFSGHSPDGRMEALELPDHPYFVGTQFHPEFK  
SRPGDPSPPFVGLIKAAAGQGP

<SEQ ID No.:0206;PRT;Methanopyrus kandleri>  
LYSMRVVIEETDVTIRADSKESVSSAAKAVKLHRSELDRYVAKDPAFVTAKVPVRTL  
EGAPEVAKLMSRAAEPFGVGPMAAVAGAIAELAARASEPTVIVDNGGDVQVRARR  
20 SVVVGLYVSDDHPLSGRIGFEIEGVLGVCTSSGKFGHSYSAGKADAVTVFAERASL  
ADAAATAICNLTSGDDPEAAVQRALEFADDFTGDLIEAAVVIRGDFVGISGRPPKIVS  
LRGGRIKPARLEPTI

<SEQ ID No.:0207;PRT;Methanopyrus kandleri>  
25 LPEIVLVGRSNVGKSSLIRAITRGAADVVRVGKRPVTRKPVFHELDGELVLVDMPGF  
GMSGVPRRYQERVKDLIVRYLEEKDNLFAIHVVDKALPEIAERWERRGEIPIDRE  
MFQFLNEVGLDPIVAANKIDKIKPIEFEEHMDAVAEALGLFPPWRQWLDTLFPISAKT  
GEGLVFLEALQERVRKAGYPEFARFFRTK

30 <SEQ ID No.:0208;PRT;Methanopyrus kandleri>  
LGKKMEKKRAEMPPARAGILSFWDDEEAPGIKIDPDYILYACFAVAVLLIIAHTMAAV

<SEQ ID No.:0209;PRT;Methanopyrus kandleri>  
35 VYRDTA AFLVEGLDEYLEDMEPSDVAEAVLKAYFEDVERVEEDDTIIFECRTSFPML  
RFIHDYAEHPEFEKYVKPEGDIEKRSEVLEGEN

<SEQ ID No.:0210;PRT;Methanopyrus kandleri>  
MSDTETIETPSGERPLLPPKARLTFSRTMPAALPETVEHTVRLYITELEHVSSNESLR  
IEEKDGTNVRVVLGRVLESELGEPVIAHTRSWVRVEEVEEYVQSVLDPSEHSLTIV  
40 EGELLPLSLFGTSVFELWNETLDYIDYHVRLMSRYTLNPRRKRVPRAWLGKLFDR  
SKVRRHVRLTYTIQRRLPDVKLADDDEFQRLHEEIERLTAIAHDKDYVPEDAVEILRD  
ILSVLDDLAAYEPEDSEPVYVYELDMYDGEITIQKPKIRQYELLADMIDGDRIKPVPS  
TLCDLGEAEQVARELMNRVEEEELEGLVIKPEKEVPGVPHARKVRAEWYLRGMKL  
45 GSRLSLKGFAGAAEKYARNEVRRALAAIETSYLYRALEALAEGDLRRASRIVKEAEE  
VTDRMSEWDDPTV

<SEQ ID No.:0211;PRT;Methanopyrus kandleri>  
LTRVERLEELLSHAVSQRSGRIRVVTVDDELRLDEEVVRRIVHRAAELDHALVESAP  
EHVLRGERAQEVARALDDILRSVLELVGVEEETERDLDDLFKDSVLVVVRGRERKA  
50 LRELVDAPIVQTGGPLVPEDYRKVNPNLPEKLPEGLVKSVERARRELEEYIRKSGAK  
RIVLVREEDDRVGEVLEEEELPEVAEELGVDHEVIVVPDFTELSPSDDLSSGRTK

<SEQ ID No.:0212;PRT;Methanopyrus kandleri>

LVLERIGRFVWKFTAAGVYVTNLPWIVVKLLKEGPKRSAKFTSQLIRTAEEASASKF  
QTVMEMVREGQVLLPELPQVPFKDIEIRGKRIAAAPRMPWDVPVLVLQFSLLATVVF  
VILEEIVAPPVMLWEALAVISAFVTAFLSLGWLRRVSPSEDIHWLPYWHSTLIILGSSVL  
5 SAILTNVPPVALVLPLEGLVPGFIVFGLPALGVAAATVWVRRKFHRTWTFGVVLR  
VQEGGSVEVVVGHDIANTLPGEYIVEGSGSEGTPVLVEVEHSGFSLTGARPVRILK  
EGWW

<SEQ ID No.:0213;PRT;Methanopyrus kandleri>

VRVWPLGFESLGVRSMATLIETPDVTVLVDPGVSIPPKRYNLPPSEEEWEALEEVRE  
10 SIQRAADSADVVTISHYHYDHTPFTDRKYEACDLETAKELYRDKLILMKHPTENINR  
SQAGRARALIEGLDELGVDFADGKRFEFGETVLEFSQPLPHGPEGTRLGYVLGL  
RITHRDHVIVHASDVQGPVYGPALEWILERDPDLVLISGPPTYLLGFRFSSDNLEKAV  
15 KNLRKLASRSGQIILDHLLRDKNYRDLSEVYEEESDNVASAAEVLGKEERLLEAYR  
DELSGEE

<SEQ ID No.:0214;PRT;Methanopyrus kandleri>

LSGVKRVEFDARLLDSLLEASDKNHPDEFFAMLGGSIDAETITIDSLIVVPFEASDSG  
20 AIFDLLSVHTCDVIGTFHSHPYGDPVPSEDDLMLFKRLGAVHAIAYPYTPDRVEFY  
DKSGRNITPVVEVRYTADDEEANNR

<SEQ ID No.:0215;PRT;Methanopyrus kandleri>

MDLAGGWHVGAAFVTVATLTTVLLALLTYSIGVVGRWIKAPIATTLGAAIIGAGVGLF  
LLAPMLSDIPKVVAGLEKNGYLTVELSTAPSDLPKALEAVKKYRGKPVGRYLELEVA  
25 MSEPVPSDRRRWVFESKVPKVFPGVKDVRFSPTKMVVRMDLKSVPSPKVSQLADE  
LSGWITYTSGFVVVGVTATIDVEVPPSEYADLKGEIREIADLRVIYDPTKAAQRRIAR  
MLPSPRTTVIASTLAFAGIAVIGWYGISHIIGPLTSPLRRSAEGRRLVRREKGRIRRET  
PGLPPRGKR

<SEQ ID No.:0216;PRT;Methanopyrus kandleri>

30 LIEKVLADLNRVEGVHGSLLVSSDGLIAEAVPPDIDSEIVGAIATTYVGSGERVVDEM  
NLGDLEQMLIEATHGKVMIVDVGEDATLVLVVEPDANLGLIRLRAREAAEEIAKQL

<SEQ ID No.:0217;PRT;Methanopyrus kandleri>

35 VIRRALDVIQEQLDVEKLVVEARKDLTSALNRVTEYFGLEKLVVLDDSGKPIGIVGDG  
RMEGGLINAVYTIRESLGDVDITLVTSEDSTNYLALCLDEYVVVCESKMTLSADIFM  
LKNDLGKVIDAAVSGQRVKSEIPFVVIDEHGLVILSNVDRCEEVGALISQLYRFVKDH  
VEGSIEWIKMTTGENKTLAVKPHNDFLIAFVVESDVEDADDACEETVKTLEKVERAV  
40 AGSPSPPAEKGEGLT

<SEQ ID No.:0218;PRT;Methanopyrus kandleri>

LAEAEPESEACRVVCMASGKGGTGKTTVTANLGTALAEALGAETYILDADIAMANLG  
LILRMEDAPVTLHDVLAGEADIEEAIYEGPHGVKVIPAGISLEGIRKANPDRLRDVVEH  
45 IIDRADFLLIDAPAGLGRDAITALSASTESLLVNPEIASITDALKVKAVAERVDTQITG  
AVVNRVTCKDKTELTKEEVEKILETPVMVEVPEDPEVRRAAAFGEVWVRSPKSAAA  
QAFKKLAAELVGIEYEVVPDKEGVLSKVIKGLFGRR

<SEQ ID No.:0219;PRT;Methanopyrus kandleri>

50 MKVSRRHPISEKDLQEVLEELRVSSGSLSGEVLTGLVEVAYVKDDDIERLLIKDGKV  
MAFERHEGWFPPTIHALLQLDEGNYGHVVIVDMGAVKPVASGADIMVPGIVEVRGEF  
EEGDGVVIDERNRRPLAVGIALMSAREIEESERGRAVRNVHHVGDRLWEARF

<SEQ ID No.:0220;PRT;Methanopyrus kandleri>  
LRPHDCLRDFLDDIVIVELKTGKTLRGRLVSFDGHLNLVLDDCVEIDEDSEVRLGRVL  
IRGDSVTLISPAEVG

5 <SEQ ID No.:0221;PRT;Methanopyrus kandleri>  
LAKGTPSFGKRNKTKTHVRCRRCGRRAYHVRKGYCAACGFGRSRRIRRYSWQNK  
KVNRRKRRR

10 <SEQ ID No.:0222;PRT;Methanopyrus kandleri>  
MARDGRRKSPVDVRIIVEGAADAETISKVIQRMALGGEYNITVTSIIPTTHAHIAARRTA  
EGADLVLIATDADKPGRKLAKKFQEELRGVVGRVERVKMPIGHDVEHVDLEIVEKEL  
RSALVRAGLKSRLDIKELREEIKELQEEIEEKEELIEELEEKESELEELRERLKEIEKEK  
ALLEEERDRLLDEVERLRDRLEEELEEELESADHLRIMDLESVCEEAEELSPEDVEPEV  
LEELGEELEIPIVVGSTRIAAPSREDAVRVLKIYKLARKVVDGEGEEENETTPGDPEV

15 <SEQ ID No.:0223;PRT;Methanopyrus kandleri>  
LKSDDFLEKVEKLEELAEGEPCALVRRQNVEWITHFPGLAFHADFESEYTLVVHR  
MDSRAVREWPIPETVEVITHDEANRLTPARAVIDDESAARKVPCYRVKNVNEDVTRA  
RLSKSKSELRFIEELVEATERILVKVLPPEDESAEVAASDLIREATIRGFQTAFDPIVAY  
20 DEGAGVPHHRPSPEEKTWTKCALVDYGIKMVYCTDITRTVVSENEAGDVLEVVNNA  
LEEALRELQAGVNPKELEEEELRGWMEDEAPGFEPHSLGHHVGVTVHEGRLMGRL  
PEGAVITVEPGLYSDEFGIRVEEMVVVGKRKCRTLTKLPRVWER

25 <SEQ ID No.:0224;PRT;Methanopyrus kandleri>  
MPNANQASAGVGALKEVLP GIRALGDLEAAEKVVKRCSGGSTVMVCVIGSTEISRV  
PGISAAGKTPESTFHTPAGDVELIYYDRIINAEV PQNPVGAPSPAVITKAVNLA SIP  
FLTVDAGAAVKPACPYIDLGGGEVARDFRE GPALSEETYDRLLEFGKTLGKELTRDVD  
FLTVGESVPGGTTTAMAVMTALGYETSEKFASSSHDSPHDIKERVVKEGLEAQQVE  
PGDLDAHEAIRRF G D P M M P A V V G I I Y G S R T P V L L A G G T Q M A P I L A Y L A E E G Q L D P E R  
30 V F V G T T K Y V E D E D S D I E S L F R Q V G D Y V L F S A D P G F S E S K F R G F R L Y E E G Y V K E G V  
GAGGAQVAAALKTKGEITPKDVLRECERVYERWMDKF

35 <SEQ ID No.:0225;PRT;Methanopyrus kandleri>  
MSTDEWLRELERALKRAEDTDMILNPALGIGVVVLGPLASASVSVIATVCVATASGA  
SVVSAGGTALT V G T V V L F A A F L A V N A A L F Y I L I R R R N K H F E R S S E L F R I V S E I L Y R T E C I  
SKSCYLAIFRKVKDIEELGHLDEVLWIFLGTITFGVAYLYVAYRLMRDFYLHEARESAI  
ASLLADELDMCISFFRKIPYRNFGIHLIVVFFPILYPYLVIYLIKDPNNHFLEHRRFERT  
LVEKLFS

40 <SEQ ID No.:0226;PRT;Methanopyrus kandleri>  
LKMTRREFVRKLVRRIHKEAETLDRDVTIMHVC G S H E R T I V E H G L R S L L P E N V R L V C  
GPGCPVCVTTTGELAAAIKAAEDGMVVC A F G D V Y R V P T P V G S L S S C D G D V R V V Q S  
VRKAEIEA E S E D R D V L Y L A V G F E T T A P T T A A V L L D D P P S N F Y V L S A H R L I P P A M E W L L  
ESGECRLDAFICPGHVSTIIGTGPYESVARELPCVVAGFEPEDVLI AVLACLKMLRRG  
45 RVGVTNEYLRAVEDRGNPVAKELMERA F E P E D R P W R G F P T I P E S A L K L R E D L A D H  
DAIEIGIRPDYTLGHDESCICDRILRGLAEPRDCPLFGTKCTPTDPVGPCMVSEEGP  
CFIEYRFGGG

50 <SEQ ID No.:0227;PRT;Methanopyrus kandleri>  
VCLAIPGRIVELDGNRAVVD F G G V R Q E V D V S L L E D V E E G D W V I V H T G F A I Q K L D E E E  
ARASLEIWEEVLKHIEEELENDTSGVREKARPSNP

<SEQ ID No.:0228;PRT;Methanopyrus kandleri>

VPWEEIEHTADAAFRVWADTPEDLLVEAAKALFDLITDLDAVEPEEEVEIEAEGGDL  
VELLDHWLEEIHFREIDGMLFSDFEVKELKKEEGWKVRGVARGEPYDPDRHPFHT  
EVKAVTYHNMKVEREDGRWVAEYVVDL

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<SEQ ID No.:0229;PRT;Methanopyrus kandleri>

LNLDYRNIVRETERKYINVNPIQRGGVLTPEARKALLEFGDGYSVCDFCEGLLHEIE  
KPPIRQFHEDLAEFLGMDVVRITAGARYAKEAVMSALCEECDVVADSLAHYTTFV  
AAEKAGATVREVPNTGHPEYKVKVDEYARVIDEVEDERGDPPALALLTHVDSEYGN  
LADAEKFKICRKKGVALLNCAITMGRMDLSNLSPKPDFMVGSGHKGMAACAPC  
GVLAMREEWEEEVLRGSSLRGDVSGREWPHKEVEMLGCTVMGAPIVTMMASFPH  
VVERVKRWKEEVRKTRWVFKEMERIEGVRQLGERPKRHDLVKFETPGFHEVAEDH  
PRRGYFLYEELKRGVIGIQPGQTETIKASVYGLTDEQVEHVRAFHEIAEEYGLEV  
S

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<SEQ ID No.:0230;PRT;Methanopyrus kandleri>

VRMVVLFSGGPDSSLLAALACDEYDPEKIILATYDNGVLIGVEKAGINYSQVKRATDA  
EVEWRIFDIHGPFHRWGLRGLERRILRFGWNPVCLDCKFCMLFHALEKLEPDVIVT  
GDRESRKYPEQTPEAKAFWEEMCGEYGCYFTPLWDWKKRGVYEELARRRVSVR  
GSEPKCMLAGSWKKPVSEEKVERYLEGLRKRLGLRSTP

20

<SEQ ID No.:0231;PRT;Methanopyrus kandleri>

MAESVKEVIDLTEIPFQPMDRQEIHQLETVLLVATLFRPKVLEMIHEQKFLTWVDSLA  
VAASALARQKAGYTISEIAEELGRTEATIRKHLQGETKAGELVLETYEMLKSGELQIV  
TGVEDIKEKLRVEEEKVERLKSEMEEVSTTISRVEGLRECCTKMEDALEEELEGLAE  
KLEELKE

25

<SEQ ID No.:0232;PRT;Methanopyrus kandleri>

LFVKFDSHVHLDVRCEDDMKTMSLAGIRYVLTLAHDPMPFRTAEALLGHWEAVEST  
AETAVDYLIDAKVGLGVHPRAIPDEGLELALEHLESKLSDLDAVGEIGLEEATDEEVK  
VFREQDLAATEDVPVVVHTPRSDPNVISKIEVARSDSLHPDLIVIDHLNEQYVDA  
VLAEGFNAGITVQPGKATVEEAIVEITNRAEHADRILINSRASLSNLAVAEVAFAE  
LEKRGFDATEAVVRDNALQLF

30

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<SEQ ID No.:0233;PRT;Methanopyrus kandleri>

VRLAFIGGTGHQGFGLALRLAAAGHHVIIGSREEERAVKAAEEAEEILAEHGYEDVT  
VEGRENSDAAAEAEVVFLTVPFFAVIDTVKAIRDSLDEDAIVVDVTVPLETAVGGKPT  
RLIRPWAGSAAETVQSLVNNPVVSAFENVSAESLRDLEKEVKCDVVVCSDHEDAKR  
TVMELAEIIPGVRAIDGGPLENARIVESITALLISLNMRYGKEDVGIRFTNL

40

<SEQ ID No.:0234;PRT;Methanopyrus kandleri>

LRDFLRVCVEDDLVVVKEELSPEYEVPAVLQELDRPVVFEGVEGYDIPLVGNLCCSR  
EYLVRLGAESWDDVLRKLAEAMDSPKEPRKERSPSFLEAERGPEFLKEFPMCRF  
YRTDGGPYLTASLVVAVEPEEGIPNASVHRMMYLGDGKFAVRVVRHLYRYYEKA  
DHDLPVAVCLGVDPRTMFACCARVPYEVSELDVAAAFWEDLRVYEVDYGIPVPAES  
EIVMVGRLTPERAPEGPFVDVTRTLDERRREPVEVEKVYTREDPYHPILPGGEEH  
RIMMGPAEATVLAHVS RVSEVVKVRLTPGGGRWLHAVVSIRKRTEGEAVNAGLA  
ALAAHPSLKHVVVDEDDVPDDPEQVEYALATRFQADRDHLHVVRGLGSTLDPSAEE  
GIMAKAVFDATAPVEKRERFEVVEVPVSDRVRRILDELP

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<SEQ ID No.:0235;PRT;Methanopyrus kandleri>



LRDRGHVSVVAGGQWGDEGKGKIVAYLAVQDEPEVIARAGVGPNAUGHTVRVNGE  
DYGLRQIPCGFPHEEAELAIGPGVLVNPEVLLDEVERLSRFRVDDRLLIVDERCAIIEP  
KHIEAERASKHLSDEIDTTGTGCGPANADRALKAKLARDVDELSEFLGDVPGLVNE  
AIDAGEDVLIETGQGFGLSLYHGIDYPYVTSKDTTASAFASDVGVGPTRIDDVYVVK  
5 AYATRVGEGPFPTELSREEVIEKFGEIELEVERGTVTGRPRRIGEFDFEMAKRACVI  
NGATQVAITCIDRRFPDAAEAETWHELPTEAKKFVEKVEEAVGVPVTIVSTGPELEH  
TVDLR

<SEQ ID No.:0236;PRT;Methanopyrus kandleri>

10 MGRLVDSTAVTVAALLALIVPVNAHVYVVVNVPDQVHTKYHWMRVFVTAASLDRE  
WAGGNAASVIPIAVQGKLDKLTQNLMSSEVGPSSVLTYPATHPGWERLPDDLEA  
ACVRLVEVAMNSGVPVKFLLCLDSAGFIPGLELAPIVAKQQGAVVWGNPLTYMTH  
FDVPVLTLDDEYLRNPEYDFSDLSIRALAVVQPLAKPEGPYKSQPFDPITLAAVQFAC  
MRPALVAFVTVGGSLNVDTLKQDVRDRFLSAYGKELKGLDDVEYVVSFGSVLLGSP  
15 KFDVGVACFPFHGLPGFLAANRMLVSMHLHGEASPLVVFDPGTGSLSAYYGDQHSV  
TVKWLSPDVSNSLNLKNQKFAAGIVVFKEALGQNFQSLNSECNSFLFICADPNIA  
QRVDVYATPNGFPKFRAVIAFRDPAGAIMAYLFAASGVELGRAVWACWELEQLR  
GYVDVSPGYLLVGDPFYPFEGPFYPLPNLPEGKDLNVKLPRAFLVPADKYRLVPLI  
FPAFVTGLTKIPKDPYSTVLADGLNFVAKRLGPNRYSVSGILIHPSGIRNAYVLPLNE  
20 SDKYHVTVTLELVTPQPSPASWRKVPGVSVCGIAVTLASLLVSGATRARSWR  
TSRSRTSRRS

<SEQ ID No.:0237;PRT;Methanopyrus kandleri>

25 LRGPWIPALALLITLIGSTSAAPTIVLDESHLVFKVPDANGQVVEKAGDNPGYRV  
PPGDSGNYYGGYKFPACAYWVPYFSLSYEDADGRIHVFPVTRGSQLGVMGIADH  
VINEVLPSSPRIEDLSSGTPDPLELFTALGYSHLVLIIVSEYDSLAISSALALKWKAVE  
DLRRRLPEAAEHPEKVGVIAMARATVISPTETKDVLIPLVPGAHVINPASPFTWQG  
VENDPFYRLCVNSDLIVVYKTEAFREEARLVFGDDAIYVRASADITAGAPAVIFNVP  
RRAESWRVAQTFEPWPSSLYLGALYGLPIAWAEDLRLTGYSWEGVILVPSAESG  
30 MYWDITSEFDEVLPILGANPHIFLSYMTLTDPNWNSIQVGTNPFYAALPCLGHYPW  
DLIGVDLTTSTLLFDLKDYLVTYNRIPEGNDQELGWGLVGPYAVVFEQPKGRPLILT  
WYALASGFCEWAWNRYLEFNRIPODQLYDVEAVAVGLEGVFALAKGLIGDINNVL  
NRDYRFTVFFGYPIRSWETEARIQFDADAPNRHYTVIMGRGDSVPDPVPMFMAQSS  
DVYAILTLEPLRTDTGPDVSPNNAKRWWVTPWVALSIVPLLSRRSSR

35 <SEQ ID No.:0238;PRT;Methanopyrus kandleri>

MLREAVKDIESGHVDPSERIHEYLEKIDRENPDINALIYINGGAPEEVGSEGPLAGVAI  
AVKANINVEGMPCDCASKTLEGYRAPFDATVVRRIKEAGAAVIGIANMDEFAAGSSG  
ETSCHGPTDNPRCPGRIPGGSSSGSAAVAAGLCDAALGSDTGGSIRNPASHCGV  
40 VGFKPTYGLVPRQGLIDLAMSLDQIGPITRTVEDAALLLEVIAGPGEDVEGTVRNAEV  
PRFSELLDPEEVEGMRIGLVREFLEVSEPEIAEVAKEAARALERAGATVEEVSLGRK  
LVDVALPTYVINYVEFFSATRRFDGRRYGRRIEHVCGKEVLRRIVAGAAISRQEV  
GQYYERALRARTWIRRRLEALEGYDALLGPTVPKPPHRIGEELSVREMYGYDVL  
VIPNLACGCPAGSVPFDTINVDGDRVPCGVQVIARPWEDLTALNVMAALERAASFEP

45 <SEQ ID No.:0239;PRT;Methanopyrus kandleri>

VTRSylvFDVGRYRELAEELVKPEDIVVEVGAAAGDTTVRLARNARLVIAFEKSEEM  
FERLRERVRDLNIVLCEDGFELGEVLKRTERVDAVFIDVGGGAQPRLLALALWEA  
YYSRFRPRVIVVRNRRLCRLIETVERVECDDEV

50 <SEQ ID No.:0240;PRT;Methanopyrus kandleri>

VSPLAEGNEPREGHPHHPSSREELEKRLEKEREAEKNLESVEHVLVMSGKGGVG  
 KTTVSVNLALALAEDEVGILDLDIHGPNVPEQLGVTEPPQGTAGLFPPLSGYRDVK  
 VMSIGTMLEREDLPVLWRGPRKSGFIREILVKTRWGDLDYLIIDMPPGTGDEVMTAL  
 QMLPEDARNVLLVASPESLAFSDVVKAGEAVDKLEARLIGIVSNMHGIVCPECGSTI  
 5 EYFSDDYSEKLAERFDTEVLARIPLDPEAKRKAEEEEGKPFVIAAPDSRVSEAFSELA  
 EAVRDRL

<SEQ ID No.:0241;PRT;Methanopyrus kandleri>

VHAMLVALVASAPATLAACAIFKFLDGPLYEPVRGGTTPRGVGVIPALIYAYLAPLTHG  
 10 VPVAAHAVLGFVDDALGRTPTFRGVEVGHARGTAMLVAFGWCCWWKFHPITGLVA  
 GFLPQPANIVDMQPRAFTFAALTATVATLPWWNPTLVSVAWAALIPYVLLDLKGRV  
 MLGDAGNASVATALLACTRGDPIGSIAFLISFTLAGAFYRFKVEPRLREYLEERLEIE  
 DPTLMDAVWDVLTGGALGDLIAKTFRGTEVPECGRRLARLLGYRRLVLIGRSTVGE  
 RVRR

<SEQ ID No.:0242;PRT;Methanopyrus kandleri>

MGRFERNLAAMFTEYALISTLQALFWIVLPRTLGPQQFGKLVLLINLAGFLSDPIHQA  
 VAFACSPELLGLGDRERASLCVSAVIVSLMLSFAVASAMLLAITFLPVPEKLRIVSDP  
 WVASGLLVLCMSPVTKVVEPFLAAGRNVFVVAIALGHAAKVVIPLLRTSWVGAAI  
 20 CTGLCPLLAGLATLPLVGRPRGWNFAIGYLTRGMVIVVDRLVELGSYAYAVLLTYLL  
 YGSKTSAFVGLGLAAYKFAALTLEAFVPPITLEVGAEEEEQAFRGLRRYLVPASIATA  
 VAIVSCADLAPVVLSTEYGPVPIVRWFSLPTLLLPYHIALRAYLIGSRRLRLLLRYRT  
 LYASSFFVILHTLTGAFGPVSVPPLGLLAALSSAPPMVAMIRRHVTVE

<SEQ ID No.:0243;PRT;Methanopyrus kandleri>

VSTEWVTRHLDYDGEETWLIESHGPPDDPTPPCSPTCRHCYATQLPPDARRHLVID  
 ELSMYPSELVNHPRLEDVRRARELVESRENPLKVITSGKFLTGRKLRILLRYVDQL  
 DFHLLSTDPSERAKLTRESVREAAARVLELVREAAREVDTVANVAVPDYNLNSLPRI  
 LRNLDEWGLHKCVVIPVGVTRYNREGIRPPTPDEMRFLEICRRMDRELDLDVPC  
 30 DSLVPLEEHLEGLDDLASRCAEALGGVDSRVGLVTGEMFGPVIEELCRATNEKLGR  
 EVLEPVIVENRYFGGNIGCAGLLTGEDVLHELEHRDLDAIVPRISVELGSFIDGVTIF  
 EVSLHAGCEIVGPERLEDLPDVLVEITHSVTV

<SEQ ID No.:0244;PRT;Methanopyrus kandleri>

MGVRSMEARWELEWEGEEPEGAGIPLSRFSKRLPDVEAYRHQVETAEAFENGHVL  
 35 LTAGMGAGKTEAALAAIEHERTFPAVFVYPTKALARDQAERMIRYGYDVVIADGDHP  
 GWRARIQEAIEVVNTNPQMIWIHARRGLQFWEFLTDFVARCLWDEVHFGPRQVNLL  
 LGIVRALRDRRHLFMSGTVGHPDSFCGEVERATGETCTHVRGRGKMAPRKFFVRN  
 TAKMADLLEDITRYVREDSKTLVFFRTRAQAEHAYQVLCRRYGLEGYVTLHHGALP  
 40 RDERRRAEREFKRGASVMITVKTLEVGDVGSVTRVVHYGIPDRVSDFWQREGR  
 AGRRGQEAESVIYPADPWTSFVTRTPRRRFREAYLEGKVERILAYAQSHLAAPPESN  
 PTESFYGEKDAYRVVREDNPRAVLRDQVDPEDVPRAWAPGCAFRAGEIWWVSG  
 PPDRETLMPAVPAEEYDPTVAQLIEEGWWTYPRIEVYAEGEEECGIGYVELRWTD  
 TVLSPPPDEPERPILVEHGDITIRVKAYYIRLEDPDRLRRRVGADSAEHAVHALNYALK  
 45 LKHGVPLSLLNHVHRPVESLIPEESDREAFLLIYESPPAVMPLLEWESAVEEAILAR  
 KENPRNLRLPRCPWPKEVDVTFESLIERYLLGILQLAEKLREREGLPDGVGRQPK  
 CGV

<SEQ ID No.:0245;PRT;Methanopyrus kandleri>

VHLHVLVRARKDASAVESALERYYPDWKVVETLGGERDPSWIVGLARERFEGSD  
 50 ALWKVLLLGRRSYPGRGRVWMEGWSAVNVGKAEVRNARLTEIVDGIELGRAAPR  
 LSVAFRRVPELRRGRLLTENQDADTMLRWGKFTETIAELAGEELPPGAYFSLRKPG

NPPEEVLYDASGKPILRIITPDEGEPSVSVLGDGEFDSRAFVRENRETLENLFEDA  
VDFLGGVAEEFDVLFVPVSGGKDSTCCLAIAVETTDRLGIDVEAVYVDTGYDLGRDV  
VEDVGAALGVDIKHVDVSDAFERGLRERKPTHENRWCTGVKLSGIKKVLKDLEGDV  
LLVVGDRDAESRRRLRPPVHRNRLLDVPEVNPVKGWGGAEVLGTLFRLGLPVSE  
5 LYEIGFYRLGCSVCPSLTAWERALMELSR

<SEQ ID No.:0246;PRT;Methanopyrus kandleri>

MAQEVRLRLSSTDHYKLEEV CERIKKVVEETGAQMSGPIPLPTKRLLVPTRKSPDGE  
10 GKATWDKWEMRIHKRLIDIKGDERTIRRLMRIHIPEEVHVEIIMK

<SEQ ID No.:0247;PRT;Methanopyrus kandleri>

VAKEKEHINLAFIGHVDHGKSTLVGRLLYDTGVIEDKDLGEGEDKFRVIMDTLEEERE  
RGVTIDLAHTKFETDNYEFTIVDCPGHRDFVKNMITGASQADAAILVVAADDGVMPQ  
TKEHAFLAKTLGIDQLIVAINKMDLVYDENRYEEVKQEVAE LLKTIGYNVDEIPFIPIS  
15 AFEGDNVVEKSDNTPWYDGP TLLEALDNLEPPEKPTDKPLRIPIQDVYSITGVGTVP  
VGRVETGVLEVGD TVRFEPAYTATGGRKGEGEVRSIEMHHEEIERAEPGDNIGFNV  
KGVGKNDISRGDVACHPDEPATVTPDDTFIAQIVVLQHPSAITAGYTPVFHCHTAQ  
VACKFEELIEKIDPATGEVIEENPDFLKTGEAAKVRIRPTKPMVIEEVSFIPQLGRFAIR  
20 DMGQTVAAAGMCVKIEKEE

<SEQ ID No.:0248;PRT;Methanopyrus kandleri>

LTVRAGVIGVGMMSGHHARVYHELEETELVAVCDVNERRVKEVAKKYDVNWYTDH  
RKMLQEEDLDGVSICVPTKYHADIAVDALEAGVHVLVEKPIADTIENARRIIDAAEDH  
GLKLAVGHIERFNPSVMKAKEVSRGDLGDIVVMSAKRVGPYPPIRDVGVIVDLAV  
25 HDIDVMRYLAETEVEEVYAAAGSAITRTQEDYAEVMLRFEGDPTGLIEVNWLTTPHKE  
RRLEVTGREAILIEQYIEQELRLMDREGVKRFNIRKEEPLKLELRDFAESILENRDPLV  
DGEAGLQALRTAVAALKSVKEDRPVSLEEVE

<SEQ ID No.:0249;PRT;Methanopyrus kandleri>

VGDKDDVRIGVFVCHCGVNIKASVDVEEVVEYAKKLPGVVYATDYPFFCADPGQEII  
30 QEAIKEHDLDRVVVA ACTPKIHENTFRNCVKEAGLSPYYMEMVNI REHCSFVHMQE  
PEKATEKAKDLIRAAVERAKRLEDVPTKEVEVENS VLIIGGGIAGIQAALDLADQGFK  
VYLVEKEPTIGGNMARLAKTFPTDDCAMUILAPKMVQVGNHPNIEMITYAEVKDVDG  
YIGNFEVTIEKKPRYVDEDACTGCGVCAEVCPIEVPNEFDLGIGTRKAIYVPFPQAMP  
35 LVYTIDMEHCICQGLCEEACPDPAIDFDQEPEEIRLKVGTIIVATGYEEFDASKLEE  
YGYGKYDNVITTELERMINPAGPTEGHVIRPSDGKEPHRIVFIHCVGSRCPGKEEK  
GEAYCSRICCMFILKNAQLIKQHEPD AEVYCCYMDVRAFGKG YEEYERAQKQFGV  
RFIRGRPAEIVEDPETKNLIVREDTLTGEPMEIEADLVVLGCGLVAPEETYSKLADIL  
GIDRSPDGGFFKELHPKLEPVSTKVRGVQIAGVAQGP KDIPDTVAQAKGAASEASIPM  
40 SQGKVEIELITATVDEDVCGGCGACAQVCPFDAIEMVEKDGKRVAEVQDVACQGC  
GQCAAACPSGAMQLRYRDEQLMPQIEALLAEALEEEEEEE

<SEQ ID No.:0250;PRT;Methanopyrus kandleri>

MRASAIATLLVAMVVIPIASAAELQTSATTETAPTATVKPSAGADAGSDVGVSVVGV  
45 PLTIGTDETKSTTTGSANVTTTIPPEYYS LASGLTQSLCDALSNGVAAVIDCLRGQA  
YHEPRPEDIVFAVVL SAVKAVVNQKLHEESFQKPLNEFHLM LVQFIGPNATLMQLLS  
AVTAELQVNLKEAKSFGPIAMLYDRVENALKSASGNEKSAYESAKSELDNMVNNLT  
KYASDIFCMLLSKCFPGLQL

<SEQ ID No.:0251;PRT;Methanopyrus kandleri>

MVNRPARIYREWKG PAYTRREYIKGVDPKIQQFDMGNPAGDFDVEVSLVARERA  
50 QVTHNALEAARVAANRYLTKTVGRQNYHLKIRVYPHHVLRENPLATGAGADRVQE

GMRLAFGKPIGTAARVREGQRVTVRIDPENFEHAKEALRRAGMKFPFPFTIVVDK  
GEELVQD

<SEQ ID No.:0252;PRT;Methanopyrus kandleri>

5 VKYVRWFEEISKDDVDVAGGKGANLGEMTQAGLPVPPGFVVLSTAYDEFLERTGL  
KEKIKEILSSHDLSDNDELQEAEEIQRLIVEVEMPEEIREEIVKAYRELCEKVGKEEE  
FVAVRSSATAEDLPEASFAGQQETFLNVQGEEDVVKYVQKCWASLFTPRAYAYRE  
EQGFEHLDSIAVVVQKMVDSEKSGVMFTVHPYTGERDKMVEAVWGLGEAVVSG  
EVTPDTYIVDKNTFEVIEEQISEQEWMTKDPETGETVKA EVPEDKRDARKLTDEEI  
10 KELAEIGVAVEEHYGFQDIEWAIEDDEVYVLQSRPVTTIPEEKGGEEEIEAEELEGK  
ILVRGLGASPGIGTGEVKIVMDVDEIDKVEEGDVLVTKMTTPDMVPAMRKASAVTD  
EGGITCHAAIVSRELGIPCVVGTGNATEVLEEGQVTVTDGERGVVYEGDVRKALRA  
EEEEEEEREKEIVVERPAAEPTATEIKVNVSMPEAAERA AKTGADGVLLRIEHMIL  
GVGVHPRKLIEEGEREKLVQVLMDGIRKVADAFYKPKVWVRTLDAPTDEFRELEGG  
15 EREPEETNPMLGWRGIRRDLEERETLECCFEAIRRLHQEGYDNIGVMIPLVQHPEE  
LRRAKRIAKEVGLKPHRQVEFGMMVETPAAAVLIDEFIEVGLDFVSLGTNDLTQYTL  
AVDRNNDKVAYLYDEKHPAVLRLIKHVINECKEAGVKTSICGQAGSDPKMAEILVKA  
GIDSISANIDAVPQIRRIVARVERKILLDKMREF

<SEQ ID No.:0253;PRT;Methanopyrus kandleri>

20 VSLLKHLSELGLSEREARVYLYLVRAGEANAREVSEGVEIPYSKVYSVLRSLKDG  
WVEADRSARPTTYRPVSPDVAVKRALEQELNRIRRELEEHAKVAVRKLSEIYRAER  
ETVARTYHGKSARETLAEVLRSSEDIACIVHLGRNLPRWLLESLRRMEGLMILRAKE  
GSEVADELEPDVKAPIDIEPRNTLIVLSADRREFFLGKFGEGDYLLSLEEPILAQGIHD  
25 AVTRACKSRSRHA

<SEQ ID No.:0254;PRT;Methanopyrus kandleri>

30 LESKHLRFLRVLEEVVSDLPERVLRRLCRLHDIRGHRGDTREHSLKVAYLCWRLS  
GKFRVDGKIALESGLLDIGYGIPRCPLCKLDPGGHCGICHWRTGSELLEEVNVDPA  
VVRVRRHMFPGPPRPTPLDWCWVTSCLKESVLSFLGFRVLPDPVLKRAVSAIYT  
LS

<SEQ ID No.:0255;PRT;Methanopyrus kandleri>

35 VIVVSKVLVDLKVLPESADVDEELKEAIREKLESMVDVDIEGMEEEPFAGLKAIRVK  
VVVPDAEGGTDALEDALKEVDEVNQVEVVSASRTL

<SEQ ID No.:0256;PRT;Methanopyrus kandleri>

40 MTEAGRIERADYAVCSACGGPIAPGERAVSHPCPKCGEVVITRCQKCRRLGNRYQ  
CPNCGFIGP

<SEQ ID No.:0257;PRT;Methanopyrus kandleri>

45 MVEYDEELDVRGKICPMPVLETRKKLEEMSEGEVLKVVG DYPPAKDNIRRFAEENG  
HEVLDVEEGEDHFVIYIKKKG

<SEQ ID No.:0258;PRT;Methanopyrus kandleri>

50 LDIREIWKELGIDLERHDELLEALPEVYEEIFLSQENRPERMSYFDEVVADIHGARVR  
ELYEMRQEGKPILGTFCVYVPEEIVLAAGGVCVGLCGGAEFPIPD AEKYLPRDLCPPI  
KSSFGFLVSRPCPYCQVATVIVGENTCDGKKKMYEIMSEHKDVVMMEMPQVKDEE  
GLEYWHEQLIKFKEFVEELSGNEITYESLLDAIERVNAKREAFRKLYELRKHPAPIS  
GRDANLIAQIAFYDDVDRFTEKVNELNEELEKRVEEGEGVAEEAPRILVAGTPMPIP  
HWKLLYVVESCGAVVCEESCTGTRYFEREVSTEGDDVEDLIKNAEAYMETKCAIF

TPNDERVKDIIKKYKEWNC DGVILYNLKF CQPYAVEHSKIESRL REEGIPALKLESDY  
SEEDVEQLKTRIETFLESLIA

<SEQ ID No.:0259;PRT;Methanopyrus kandleri>

5 LGRKVIKDVVCPFCGTLCD DLEV VVEDGEIVEVRHACRIGAAKFLTAQEDHRHTEPM  
IKENG EWKKIDYEDAAEETARILVEAKWPLMYGWSSTLCEAHEVGIEIAEKVGAVID  
NTASVCHGPSTLGLQDAGVP SCTLGEVKNRADV IYWGCNPMHAHPRHMSRYTAF  
TRGFFRPKGREDRTIIVDP RRTATAELADVHLQVRPNEDYELISALRAAVHGIEIER  
10 EEVAGIPVEAVHEVADLIKEASFGTLFWGMGITMSRGRHRNIDNAICLIRDLNEYAK  
WTLIMMRGHYNVTGFNEVLTWTTGY PFAVDFSRGYPRYNPGEFSAVDVLIRGEVD  
AAFVIASDPGAHFPRKAVEH MARIPLCVDPHWTPTAELADLYVPVTIAGIEWEGTA  
YRMDSVPIRMRKVVEPPESMLNDVEFLEMVIEKVEEMV

<SEQ ID No.:0260;PRT;Methanopyrus kandleri>

15 VRVLGVDAGSSHLKCAIVEDGSLEDHTVVESTGPVKKVLRRALDELGAGIDEFDVTA  
VTGYGREALSDEFDETVP ELPAVALGASQLVEGARTVIDVGGQDTKVMKVEDGKV  
VDFQVNDKCAAGTGRFVENVC RRLGIEMSEVDEHASGADDPVKINSMCAVFAETE  
VISLVNRGIDVERILLGVLD SVAERVATMIDKVSPEPEVVLVGGMARCRVFAELLSDR  
20 LEMGINVPNEAHVAGAFGAALWVLEK

<SEQ ID No.:0261;PRT;Methanopyrus kandleri>

25 MARVSPVLVTGLVAGVSAAILQAVFKVSPPPAYGICIACHTRDLVNWIVNHAAGTTLG  
MAPVSKPFPVLTVVGIFIGALIAAFAHG EFRIRRTHHPILGFVLGFLVINFALFMGGCPI  
RTSLRTMYGDVALLGLISIAVGVILGA EGYLKRKA

<SEQ ID No.:0262;PRT;Methanopyrus kandleri>

30 VAEYLHAIGTLAFGVLIGYLGQRSAMCFIGGIRDVYLLRDTWLVQGLIGFLIGAFFGLV  
VFGAAGMIKKFPWFLYKGASAI PGDVLGKKPGFAAHAAVTVIGGLGVGFLSVVQGG  
CPFRNYVMAAEGNVTAMAYLLGVFVGAVFFHACIVPIFGPPK

<SEQ ID No.:0263;PRT;Methanopyrus kandleri>

35 MEMGLLSRLRSASF SRDEGPSDEREGKGLIVFESARDAMKAERTLKEAGYDVRAVA  
PPPEIREGCDLAI EYDLVDEVGVRR TLEEIGVEPLKFVSLEDPSLKPIELVRVKEVDG  
YIMVRCGNMKVTVDRDGTIVNVSGG GCPDVPYLAHELVGKNVLELSENSMPASLG  
YTLCAYTLDKAVRKAKEVLLGEGS

<SEQ ID No.:0264;PRT;Methanopyrus kandleri>

40 LAAAAARVLEFLGEDEPRLITAGDLGEGDGSLEIYRRLREVDDDLVIHYIKPKIDEIR  
RVDTS GKVIADAGGMYA AKAAGIGPEFHLFLPDPGELAFLADEKAHHPAYVRGFIAE  
VDEEEVPSLVRRAYEEDQVPDYM VVKGRRDHVVHRGEVVETVDEPLVEAMECIGG  
TGDTLTGIVAALIAAGFGTEEACVIGCRVNRRLGEIANATPTTRIHELTRAIP EALCEE  
LRE

<SEQ ID No.:0265;PRT;Methanopyrus kandleri>

45 LAEEEEPRIGVYVCHCGVNIAGVVDVKEVAEFAKTLKNVVVARDYKYVCSDPGQEIIQ  
RDIEKYDLNRVVAACSPRLHEPTFRRCVEEAGLNPYCFEMANIREHCSWVHMDD  
PARATEKAKDLVRMAVAKARLLESLETIKVDVTDRALVIGGGVSGIQAALDLADMGF  
EVILVEKEPSIGGRMAQLDKTFPTND CSICILAPKMVDVSKHPNIKMYTYAEVVEVDG  
YVGNFTVKIEKKPRYVDEDACTGCGACA EVCPIEVPNEFDEGLGMRKAIYKPPFQA  
50 VPSVFTIDEEHCIRCGLCEEVCDADAIDFDQEPEIV EEEVGAIICAIGYDTCDP TERE  
YGYGVYDNVITSIELERLINASGPTGGKVVRPSDGKKPKRIA FICVGSRDPHRTNP  
YCSNVCCMYAMKLAQLIREKYPETQIDIYYMDVRAFGKGYEEYYERSQKQYGIRFIR

GRPAEIVEDPETKNLIVRAEDTLLGDVVEREYDLVVL SVGMVPRDSADVIQEVLSISR  
SPDGFFMEAHPKLRPVDTAIDGIFLAGACQGPKDIPSSVAQGSAAAAARAATAAAGE  
VAVEPIVSEVDEEICGGCGTCVELCPYGAIELVEKD GKLVAEVTAAALCKGCGTCAAA  
CPSGAMEQNHFKTEQLYKQIEGAFRDPA

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<SEQ ID No.:0266;PRT;Methanopyrus kandleri>

VRGVGTLSSEMVVNVEPVTRVEGHGKIVVEFDEDGNLKDARFHVVEVRGFEEKFLEG  
RPIEDAPILTPRICGICQVAHHLASAKAADEVFGVEPPEPARKLRELMHHAATVHSH  
ALHFYFLAAPDLVKPEEEDPMKRHVLALARENPEVVKCAIELRKIGQTIVEAVGGKPI  
10 HPVTA VPGGVSKPLEEDRREELLELARS AVELAERTVDLAEELTRREEEGLELGY  
LESYHMGMVSDGVHELYDGVIRVVDPEGNV DREFEPSEYLDHIAEAVRPYSYLKFP  
YLRDKGEEEGLYRVNTLSRLNVCDR MATPRAQG RYEELVDEYGKPCHHPMLYHYA  
RTIELLSSAERCVELLEDDEITGDDVREEVDPDDVTGEGIGCVEAPRGTLIHHFKTDE  
EGLITEVN LIVATVQNNPAMD LGVKKVAEEYLRSPEDASPEVLNRMEMVIRAYDPCL  
15 SCATHVLGERPRLTLEVHRAGRLVRIVEG

<SEQ ID No.:0267;PRT;Methanopyrus kandleri>

VKGVVRLVKIATTWLCCCSGCHVSVLDLHERLLDLLGDAELVHCPVLM DTK EIPEDV  
DVVLIEGGIRNEENVEVAEEFRERAEIVAVGTCACYGGVPGLANLYSNEELLRTVY  
20 VETASTENEDGVIPSEDVPELTWRVRPLSDVIDVDYELPGCPPEPDLIADAVTAILDG  
REPELSTTNLCEECPRKKEETVIHEIRRPVEGEPDPDRCLLEQGYPCMG PATRAGC  
GARCPEAGVPCAGCAGPAGEIPDQGAEMMSAIASIFRADVDDVDPS ELVESVPDVV  
GWFYRFTLAGSLMPFRVDRE

25

<SEQ ID No.:0268;PRT;Methanopyrus kandleri>

MGEWKPKIIAFCCNWCSYGGADTAGVGRMQYPPSTRIIRVMCSGRIEPSLV LKA FR  
EGADGVFVGGCHLGDCHYQSGNYKWWRR AELLKKFLAEIGIEPERFRYEWISASE  
GEKFAEVMTEFHQTLL ELGPLERERL KRL

30

<SEQ ID No.:0269;PRT;Methanopyrus kandleri>

LKALEQLSSYVAENRAGNRWDFKLAGIRVGRGRTVTFFRHILLASLACLTLP IAATCV  
NEEFESKVESLIQNPDFQGTKEITLYASGSYVMTGRIKVS YRGPEEVEPVEVDKLIN  
GLKELREDLDPLAGQNEPIKDLLGALKKFDDTSDVLEKLKEKTQGLKLAACEIDVDL  
WYVGETGTPPSDLPQILQQLRTEGELHLSYKIPYPEAHVYVVGSVELLDRALNLP IR  
35 AVFSYDYPNDGSGVKVSVDTEHRKFTIETTDNIYNLIVVELTLHGGLQEVEKLADLSV  
ESSEDLQKLLENTEVEKVECYPRGGRTAEINGLPLMVDEGA AIVVYAVGSNPINSIVA  
SKIAELMGKNPLVVT LGNADLQVGTGKTLVIKGSAPGGLVVIYGPAGPDNTLDVTS  
RVGTLQVARALGAQVPPLVSLFGWILGPLLGSITTTYTPAFSGELRMSPRGIGMATP  
AVIAALLLVGHGRRRSK

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<SEQ ID No.:0270;PRT;Methanopyrus kandleri>

VILKFDHWSGPLYLHCSIRRGDPRIIERSSTGVIIQAISTEYADYRVIASAA CRAIRAF  
ESDRNLARSLDLEFLVRLTGTRQIREAIDRAEPGDEFVLVVASRDRKKVRGV LKELE  
EEAEEL EEFPERDGYKELLRTAASVDAEE

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<SEQ ID No.:0271;PRT;Methanopyrus kandleri>

VDPRELAERLTERDLRILIH LAESGEATPEELAESLDVDLGPVMRSLYWLEERGLIES  
EEETHEVYELGDEGKEYAE EGPLRIVEVLRKIGGEGRL EEVLD RAGVPRKLAGPV  
LGWLRRKGLAEIKREDGETSLV LLEEEPEDVDQSVLEALAAEGSASVEELARKLEM  
50 DEEEVEKALKRLSERGDVLRAREETVKKVRLTERGEEVAEHAPEVLERDWITELKP  
EHLREGTWKEKEFKPYDVKAPTSP TFP GK RHPLKEVINEIRRIFLEMGFVEVSGPLV  
ESSFWNFDALFQPQDHAAREMQDTFYLKEPAEAELPDEEVVEKVRAVHEDGGDTG



SRGWGYEWDEGVARKTVLRTHHTAVSVRKLYEVEGPPLKAFSIGRVYRRETVDYK  
HLPEFHQCEGIVLAKDVSFRDLLGILEEFYRRMGFEVVRFRPAYFPYTVLSVEPEVY  
FEEKGDWVELGGAGIFRPEVLQPLGFDPDVCLAWGLGVERLAMKLKGIDDIRDLY  
MSDLKTLLLEPTARARR

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<SEQ ID No.:0272;PRT;Methanopyrus kandleri>

VFSGIREGAVQVPKWILDVLTGKKLRVHELRAVWVGHRELMLLSMDVRDDENPLS  
LTAGVLGLFSAALADVFTWSRGSELSYPLTSANGDAWRVCVDAAVLAVIDAFSSEL  
EVSVEAFVSEAGIPWLATLANNGFRPESVIRGTDEVFVATLLNLLKYEVKHRGDR  
WRDWWRRLDR

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<SEQ ID No.:0273;PRT;Methanopyrus kandleri>

LESPVKEHREGTLIRVRVNPADATTDLKGVDWVRGVLEVDVAAPPVKGKANRELLE  
FLGRKLNTTCELVSGEKSREKLVLRDVSVDVDEVKERLGLR

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<SEQ ID No.:0274;PRT;Methanopyrus kandleri>

VKPPPEEAWIGRPVRPAQGFHTRVSMIAGVMLGGPADVEFPRMAHPLELPHYLEID  
GDTWRRLRCRLESLEDSPDLGDAVREYIREAFRCITKPDFATALKACTPVIALDTP  
LWRDARSVRAIARLLTRVTGVEVQPPPIAELRATLYPIAERALVSTLLAQAVAH  
IRSLGLRSEYLSAYLDAPSGESPPELGDVSDLYATLVKDFDGYLARVRLNRYVT  
TAGRRFVLTPDDYDPTWRGYLQGLRRFWENRRGMEEIIRQWGLA

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<SEQ ID No.:0275;PRT;Methanopyrus kandleri>

LREANADADPPDEVRIFDTTLRDGEQTPGVALTPEEKLRIARKLDEIGVDTIEAGFAA  
ASEGELKAIRRIAREELDAEVCMSARMVKGDVDAAVEAEADAVHIVVPTSEVHVKKK  
LRMDREEVLERAREVVEYARDHGLTVEISTEDGTRTELEYLYEVFDACLEAGAERL  
GYNDTVGVMAPEGMFLAVKKLRERVGEDVILSVHCHDDFGMATANTVAAVRAGAR  
QVHVTVNGIGERAGNAALEEVVVLEELYGVDTGIRTERLTELSKLVERLTGVRVPP  
NKAVVGENAFTHESGIHADGILKDESTYEPIPEKVGHERRFVLGKHVGTSVIRKKL  
KQMGVDVDDEQLLEILRRLKRLGDRGKRITADLRAIAEDVLGRPAERDIEVEDFTT  
VTGKRTIPTASIVVKIDGTRKEAASGVGPVDATIKALERALKDQGIDFELVEYRAEAL  
TGGTDAITHVDVKLRDPETGDIVHSGSSREDIVVASLEAFIDGINSIMARKRS

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<SEQ ID No.:0276;PRT;Methanopyrus kandleri>

VTHVVLVGLLETDSGKTTAALPLVSALDLVPFKPRSGHNWVLHYDHTTRRCVELGL  
PVSRLVLKLAKEVDLPLITLNPVHRVWTSPDVGTAVKSDVSLRYFSAQTDAYVL  
MDRLDETFLYTEGTELRYVPDETMEMARECEVREVREEPAPEELRRTIDRAWSR  
VRKEGPVLVESLNNLAVPWPVGLKYDGVAVAVGPGTALVYDLRDYARAAETLAGP  
EAVTSLLEVLPLEVVRLPPLDRTRRS DPRKLEEAYRELIGAVQERL

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<SEQ ID No.:0277;PRT;Methanopyrus kandleri>

MLEWRPEPGYDPLETAERVRGWVCEGRRRKYYRFRETRFYGGCATADAVGCNLD  
CAYCYVNYPRRHPWDRRWKFHRPIDVVERLKNMGDVVRVSGCEPTLCKEHILELI  
ELCGRELPRKRFVLETNGTILGADR SFVRELGNHEHVHVRVCLKGYDPQS FARITN  
ANPDGFDLQLRCLRYLFKEGISFHPAIPRLFRPEDIDKLAGVLSDIGVPPSSLEVEPIR  
VYDHVRRELRRRGLTVVR

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<SEQ ID No.:0278;PRT;Methanopyrus kandleri>

LCGDPGLLTLVLLILLAVASLPAGSVVLASALAPVAVVGGLALEYGLVDPRTVPVFG  
LLAVPGLILGLRTARKYPKQHLRHLIIAVIITVFFLSNLTIIYVFKGTVSFVAGGDVPR  
HASLALSFLTGTGKPPVFYDTLRREYRPVHYPSGLGHAAITESIVSLLFHPKDLREAAS  
WRVQYGSTIIELVEYHVSTAMIASAIIILLTLGRLPILVATLVACAIYLTYPGPVPPFFQ

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- SLAMLSASIVAILNSRWISTFLILSAVVIHFYSVVVMSLLIPVLIQTRKQSTISLLGMAT  
GIIQFPYVHWSAAVHFPRYPAPHPNHLPPDRELGPVYIIQFMFTAFAAYPPFIFPNAS  
DMLYTIPFIAAVMLILIRKLLPQDLKIWIMYITTIVILGVTFGRFIGKRFLFTAPLLTTLT  
LGFAAANYHLLALSILISYCALTTDWWYIYFINTPPIDVLEKHWKLFYNSFCKGETIAT  
5 VSIGLLPFTSTWKPQKVAQVVRTFPEPGLPILVTEENNLTLRLLPLTQVKGKYIVEK  
LPPTKRVSVD DRAGSFRRNVLVAAERYDSHVLTYYAIMSYGSVPTVLVIKGTWG  
ASMAFMTLMEPTDDL SVFIRTRHVPNGYLVRISDWQGV RV MKITISGARWVGDKLV  
FHGSLRDLIANIRVTGDLV
- 10 <SEQ ID No.:0279;PRT;Methanopyrus kandleri>  
LSDPGLFMLILLVLLAVASLPAGSVVLASALAPVAVVGGLALEYGLVDPRIVPAFGLL  
AVPGLILGLRTARKYPKQHLRHRLTIAVILLTAYLSVDLTLYAFKGNIGATMGDPSRH  
ASYALTLLTAGEPVFDTLRQEYRPVHYPSGLGHIAITESIVSCLYHPKDVQEAS  
WQVQFGSVFLELLEHHLDAALITSSIVDLLLIARGRLPIYIIPPLAYITYLTCTAQYAEFI  
15 PFFQSLAMLAASAVALILNSRLLSGLLALGAIAIHAYGVIVTTLILALLWAKTRITVT  
PILLGTIIGAIMQYPYVHWSVMTYFPRYPAPHPNHLPPDRILSPVACLLQFFFTAFAAY  
PMILFPTTNSLPYVLPFTVINVLIIKVRKLLPSVLRVMWITCIVTILALAVVSGSIVGGRL  
LVVPLL TAMS LVLPAANRNLLALGALFGYCALTIHWWLAIHHGNEGISTLPVWVLKE  
HWNIFYKSLCNKDVIATLPEGLLPFTCTWKPREVAYVVRTFPEPYTSILLTAKEGSEIL  
20 LYAPPVRAERGYIVKKLPPPGRVWVAGNRAGSLRCNVLIGAERYNRQVIIHVNVVNY  
SWVPIPTINIKGKLRKRAIVLSTPKSSTLPAINVHRIPEGFLVRISYSHGVRVVKITISGA  
RWVGDKLVFHGSLRDLIANIRVTGDLV
- 25 <SEQ ID No.:0280;PRT;Methanopyrus kandleri>  
LGYEDEFPESELEFKRAERVMPGGVSSPVRRFDYPYFYVERAEGSRLYTVDGHVLI  
DYCLAFGPLILGHAHPEVVEAVVERVREGFHYGTPTLPELKLAEKVVELVPNVEKVR  
LVNTGTEATMSAIRLARAYTGREKIVKFEGCYHGAHDAVLVRAGSGASELGAPDSP  
GIPESVAENTLVC PFNDVEAFVETVERFDEEIGAVIVEPVLGNAGCVPPDEEFLKVL R  
EYCDGTERLLIFDEVITGFRLELGGAEYYGIDADLVCLGKILGGGLPIGAFGGPEEY  
30 MSRVAPEGKVYQAGTFNGNPVSATAGLVLTLEVLERERPYDELSSKAERLASALEDG  
LEDRGIEGVVNRVESMFQVYFGIEEV RDYADVNSADHDAFKRFHRELLEHGVWIAA  
SNYEA WFLSIAHTETDLERTEEA FEEALDRLTG
- 35 <SEQ ID No.:0281;PRT;Methanopyrus kandleri>  
VSEIRLGLVVTEFNREITYAMEELAVQHAKDLGAKVVERVLVPGSFVPLAVRKLE  
RDDIDAVVTLGAIKGD TDHDQAIAQQA FRKIQDLMVEY GKPVALGISGPGMTRMEA  
LERVHYAKRAVEAAVKMVRRLRELEGE
- 40 <SEQ ID No.:0282;PRT;Methanopyrus kandleri>  
LAEDDKVFRRARERLVERLKS LGYIRSNRVAEAMLKVPRHEFVPEDLRDRAYVDSP  
LPIGRGQTISAPHMVAIMTELLDPRPGHKVLEV GAGSGYHAAVVAELVKPDGRVITV  
ERIPELADFARNNLKKTGYDRFVKVLVGDGTKGYPPEAPYDRILVTAGAPDVPESSL  
EQLKPGGKMVIPVGDRHMQELWLVEKTEDGEIRRRRHGGCAFVPLIGEEGFQEPE  
S  
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- <SEQ ID No.:0283;PRT;Methanopyrus kandleri>  
VIEIMTREEFFDLITEGLKTAEIRPSDHR SF RYLEPGDTLVFKNFKAGTMRCIETVVRN  
VEKDLPKEAAERFYQEAGFESPEECLEGLKEMYDGLPEKVDVAEFEPVREWEE
- 50 <SEQ ID No.:0284;PRT;Methanopyrus kandleri>  
VFFAGTGGGRFAMITQKRRTGGFRLEFPDFHLHVDPGPGCLLSTRLSRRPTTAVDA  
VFSHSHPDHYAEAEVLVEAMTRGGTKRRGT FVGSVSAVEGYSDSDGYGPVLSA

YHRSLPEEVVALEPGDEIDLPAAGTLEAVPTTHGDPTGIGFRLETEDDSIYYTGDTELR  
EDFFEVIEDVTVAINVVRPGSDRIRGHLCTYDVIELVSEAPELRKVFITHFGMKMLR  
VGPGREARRIEHETGVETVAARDGRAYDL

5 <SEQ ID No.:0285;PRT;Methanopyrus kandleri>

LTLVLAYAGTDGALVAGDRRTLVARMDDEEKMVKVEEKLYSGEIRTEEELESFLKDLD  
VEDGYFEFHDDRKKVWKNDEVVAGEVGVRSAKGVRRRRVYATPGAHAVELEGE  
KVLSKNFGGPALIVEGPKVVKELVIEFVNSELGGKPDLESRLNALDDLFEYVSSGTIL  
VSSEYDAYEVKGKADPLARARLQKAIDEDIERLREHRRRLAEEMLKHIREGYDILKE  
10 GVVGEVVEVGTEEEGKGVEDVPPERRIVVRLAEDVDARHMGDVVAGPGEEIVMAV  
EGNPREEVEPGDRVVKDGVMMKIDGKDLPVITGYSICRTRR

<SEQ ID No.:0286;PRT;Methanopyrus kandleri>

15 MTCELCGDPASSFLRVCRECILNRWDKAREILREAHAEARRELGLPPEPPSEGLEC  
GACVNRCRIPEGKVGCGVVRNEGGKIIREHAGRAYLDPHPTNCVGAWVCPGATS  
RGYPKYTETRGPERRGRYNLAVFYGGCTHHCFFCQNYEHWVERERLSAEDLKRRRA  
SDPDVTCVCFGGDPTPHYDQVIEIGREWEELRVVRCLETNGSLRPKLMRRIAEICY  
ESGGGFNMDVKAYDPRIYYALSFSDEPYTFKNLEIIGREFAREDPPILRPSTLVVPEY  
ITPEEVEKIAEFLASIDERIPYRLLQHVPQYHSADLGYPVCVMRECKRAAERHLENV  
20 DACIYRYA

<SEQ ID No.:0287;PRT;Methanopyrus kandleri>

25 LPSEEEVLKELKKVKDPHTGLDIVSMRLVEEVNADEENIEVVVRPTNPFCSALMIVE  
QVKATLESFAFEGVNVDVKLVGHVLTETEEE

<SEQ ID No.:0288;PRT;Methanopyrus kandleri>

LIAQVIASTTDASLVEILSGNERLDAELAFLGTPVHAFRPAEPVRHFVRNNDWSDVK  
VALFCTYSLHPGKTIRWMREKIERAGGEVIGELTVKGEHPFLPLIARGHPDERDVQK  
30 ARKFAKEVLRKARG

<SEQ ID No.:0289;PRT;Methanopyrus kandleri>

35 LNATLIRINRPVAESTYTSLRGAKAEVVRVEREEREIHPKPPFETGTMLQAATRRLR  
LSSSERVMQLAQDLFEGGLITYHRTDSTRVSEEGKRVARDYIRANFDPEDYNPRTWE  
PEAEHVEGAHECIRPTRPADAEELRTMVREGAIQTTVTLTSHHLRLYDLVFRRFVAS  
QMKPAKVLYQEAVLEVEVKGVPVAEELSGVLEIVEPGFTKVLTEYDLPAYGIRETP  
ELEEGDRLEIGDVEVLERHEEYPYDQSELVEDMRERGLGRPSTYAQIVEKLFRRGY  
VYEVPPQRRWIFPTTRGEAVYEYLSTHYERFVSEETTRDLEERMDAVALGKAEYQEE  
MEKLYLELERVVEMPDPEP

40 <SEQ ID No.:0290;PRT;Methanopyrus kandleri>

VMNVGAREHHIDGNTVKFFGIERWDGHAPEVPVPVVAFTAAPGGSVDNVEEVGKE  
VLSKGQRYPRSTARALGY

<SEQ ID No.:0291;PRT;Methanopyrus kandleri>

45 LTVLSDRDIKRALEEGLDIVVKPLEEEYLEEALGPASLDLRLGNEFVVFKTLHKPCIDPT  
VDAGENTERIVIDEDEEFVINPGELVLAVTHEWIEINAPDITGV LHGRSSLGRLGIQAH  
VEAGYVDPGWRGRLTLELVNFPNMPVKLRPGMRVVQIVFHLSSPAERTYAESSG  
KYHGDERPSPSKMHLDFCRG

50 <SEQ ID No.:0292;PRT;Methanopyrus kandleri>

LDLRIAHVSDLHLDSESRDKSVLEAAIERVKELHPDVVVSGDIVKGWRPRHYGETER  
IFRALDVGKLLAVPDNHDEMRRGGEVVFRKHPYFRRKYREFTVKSPSFGELLMYPPII

LEGDGLCVIALDSTEADRS DGEVGLDQLLRAEELIREIEPEFIVLTMHHHVTPFPGLID  
VSTVLDAGNLREFCVANGVDLVLVGHKHIPRVDYFASKEGGCAVSHAGTLCPEVAR  
YVPPAFNVVDVERGEVVQVLEYREGEFSEPKLMGRFRIEGEHLRPVELGYDPSKA  
WMRGY

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<SEQ ID No.:0293;PRT;Methanopyrus kandleri>  
MGLDYEPSHLMFLVTVLDDRDGEVLGDAIQKLIEREEVLACHAVPCVTKKNRPGHV  
LVVLVDGGEDPDRVAEDVARDIMVLTGSTGVDRFDADGVYSVPSRFEDVRVVYGE  
REWRSVKIAETEEGEVTVKAEFDECREIGEETGIPPREVKAMVEAAARVGGWVD  
LKEREIKVQ

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<SEQ ID No.:0294;PRT;Methanopyrus kandleri>  
MDEYLRFLQMLVLSAAVGMVVGLEREHAHIARRIAGFRTFTLIGVLGGLTAYFYELG  
CVPIATVTSVGAAALAVTMYVMRVYQRRLLGIVTPLALLATFAAGALVGMERFKEGA  
TLAIATAVLLSRARIHPVLRRLSDRDVLDALT VFSLAALVYPLCPPGPVDPWGVNL  
RRVLEIVLLVAVTALGYLGVRMSVRGGVLTTSLVGGFVSSSATTATVVARFREL PW  
VPAAVVPAATSVAIIRNMILVAAVSRNLAVVKKVACVAIPA AIAAGFAVAVYESGRAEV  
DEEDLRRVVRGRMRSPSLKPAVKLGLLISGFSMTLKIGQLFAGKAGLVVGAVVGS  
ASSNAMSLSLAYMVNSGTLSSSTAGILIALSSLESILVKYLWTAVFGKREVLERTWRT  
LLPPTIAGIAGFGVVLG

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<SEQ ID No.:0295;PRT;Methanopyrus kandleri>  
LTEFWARCYALAAKSLIEVMRTKSYPIQYVLRKTLSEYDDKTQSVTRSMVYDVLRRY  
GTLERVVEDVSRSELPLERLVMVAANEVLYEGKHPAPVTD SATRAAKELGLNHR  
RVHGVVADLEEYERPEPEDEIDRLCLEYHHPRWFVEKFGALLDEDELKELMEVHNE  
PPEYYTFRVNTTAADVEDVLREFEEHGFEVERGEYVDY CIRVKKGQPLRLEELECW  
REGHIVPQDEAAALVTEILNPQPGERADLCAAPGGKTTHIAQLTEDEAEILAVDVSR  
VRLRRLERFAERMVFENIEVLRADVRRLGRNPRYVGKFDRLVLLDPPCSSLGTLRSD  
PDVKWKIGPRDIRELALKQRQLIRAAARLLKPGGVLYSTCTITPEENELVSEAIKR  
DRLRPVDVRSEFEFLHPPLRVDGVSSSLEAGRMWPHVHGTGFFVAKLKKLT

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<SEQ ID No.:0296;PRT;Methanopyrus kandleri>  
LRSVAVAGDLDRFGVEEERGWPEYSPNPATGLLTELVERFLT KFP GAVAVKGPD  
RERGTEEFVVEIPGGDAFLDEILEECERIRRRFEREFKGEVTISLGVGVGPAPSDRR  
SFREAESPAVRRALREALREAKRRGGNTIVRG

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<SEQ ID No.:0297;PRT;Methanopyrus kandleri>  
VAKILVTDPIHEDALRKLEELGEVVVLEDADEEEEIREHVRDADAWVVRSGTRVTRELI  
EEAKNLKVIARAGVGVDNIDVKAATERGIIVNAPESS SISVAEHTMGLILALARKIPQ  
ADRSVRRGEWDRKRFMGVELAGKTLGLIGLGRIGQQVAKRAKAFEMEV TAYDPYIP  
EKVAEELGVELVDELEELLERADVSIHVPLTEETEGMIGEEELKRMKSSAFLVNCA  
RGKIVDEEALIKALKEGWAGAALDVFAEPPGEDHPLYELDNVVLTPHIGGSTGEA  
QRAAGLIVAREIERVLKGEIPENVVNLPLAGVPDDVRELMEVGERLADAAAQVLEER  
LRWVQVKVGGEELEDREKEALKRAVLKGCLDRVLTEPVTMVNAVDVAERRGIEFEFT  
VSDELEGGEVEVVRSDEDEISLRGELVEDRVYLT SVNGYEVRFKLSGPTLFWWHV  
DRPGVIGEVGIILGEHRVNVAAMEVGRRERGGGEAIMVIRMDEEPPEECLRAIDEV EP  
VRRVELVRC

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<SEQ ID No.:0298;PRT;Methanopyrus kandleri>  
LIESHVPIPSDPVERIRALRVLREVHRRKRKPSLEV TYRTVSGSTCGPYVARWRRD  
SKFKHGRTLYLGKPENESVRFVEWLVS LDRNEVLELARHLMRNLRSVLKTLLTGVS

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DLPYKRARRVLARGLALTFDARPSESPRIRDVLEELPDRLESFAIRTLGGWPAHYSA  
HLRKVIRHRRKSLDGKHEIPDVKLELERWKL RHVQ

<SEQ ID No.:0299;PRT;Methanopyrus kandleri>

5 LLPYLVGLVLALTPASGEPLIQGSLSKDLEFLHEYFQKRVLPKWKDDPHVIVDVVQY  
SESAGYVIYLPKENLFAFSRVQESVEPGRVRVVLPTCGRPVAVEERLEGPAVIASV  
NQCPLTEGSSANLGLDVVGDHVCSEFGYVTNPALGAPARCEYVLTLSAGGRVVD  
EEGLGSFDPVDVEYEVYSDRVVMRILGFPEGVEDLALVIDATFDLRKGRILVDRRES  
10 TSELVSKLRELRARWGTPPGEGIEGFSGDLLRTRSGAEPLWVGFLSHDDPLVR  
FVEKVIGMYSQGASEKELQKVMGEHPNVEFLFPERNGESGTSKIPFWVLPLLPVPL  
AGRRNDA

<SEQ ID No.:0300;PRT;Methanopyrus kandleri>

15 VLGPLIALVSVPTGAAADHVTDVTSKVNVDGDYEACKDLLVGVEVYDDQGYVIAS  
CCWDGRCDALGETKVSSENHLSRTVDRFIVKMTVRYKNQLLLDERVFIRVIPGQGVII  
EFNGRTIELRSANGTWGPPEPLRVVRTIDGKTVGITFRPSAKVEHAEQLSNQWVVD  
FLYSIDGDVIVHDKKGDYHITFQAHVKHTPLKNAEHDYMQTCPYGGKKTVDEELTHG  
TFGHLVDDHATKIEDLTRAWANEKMPVNPLLPALAAVLSLLGIRREY

<SEQ ID No.:0301;PRT;Methanopyrus kandleri>

20 VESVYFTLSLFGCLDVTSSVGPRLMKDYGKNLAGESFLNRCWNPGCSSTARRGV  
QVGGSGRRARGVSSDPPQGRSRGRRARSRLPTNQNGIDHPRHFSEVARELRGE  
SLALKRRTPFDFEFDVLECRG

<SEQ ID No.:0302;PRT;Methanopyrus kandleri>

25 MVPAPLALVLSTLLTVQPANSLQWKDCPWQLGRLSCATQGLAVDYPYDLAGDHLL  
LVSPWLPEGDHYRVILAAYGVEELPLPLGTRVHRVFPSEVRRVPWKLWEQIPESP  
RPATFGPWSEVRYSLREWGCPQGYVDFDPDEWDWSELQSSLELAVLLEPERTVDG  
VFAVEASLPVREDRIGKERWIRLALTPGRWLVLWGWTEDFDVRTPCRTLFRGGAPY  
30 DEAEYGLDGVKLRFWVAEYLLDLGGRARIPPSEYYSSVAGLFDLNLPGGWFRP  
GLQHEHRLYYGYGVLLVLRADRS LIVEFKAPEAGKRFRSADTVDQWFLSSRYIARH  
SHLLEPLRKILRGSRPDGT

<SEQ ID No.:0303;PRT;Methanopyrus kandleri>

35 VSMLNAEPKWFQWVEGCDWAKYLATRDTPVDWTGELIGENWRANWVRAAKYILY  
CAPYKGDSEVKVRQAWYGSITLEGHVPDKGAPAKFGEVDWSDKRPDMRYIGLAFD  
YFDPVFDLHVPEDLRRTMRRLAELMVGLGKVSEREYAESILKDEYMPPRSSEPSR  
SREYEIRNGQYWLPGEWCWITLNGTSLYGVAKSPAQFPNAGEAERKLMNNNP  
MFQAAVRLAYWVATHIPFIGWFNWFPLAGYCGHLSPMYYEGPAAPLLFPDEGWVC  
40 TDHAVLTVALYRAAGIPGYVGGELEPFGDHSWTAVRRR

<SEQ ID No.:0304;PRT;Methanopyrus kandleri>

45 LEITHGRPYDEGSWHEIFIDPTGPMMHKPKWKIRDSVVLVPKHKPMNDDEYACASS  
QRPYDMLSEAVRDAISRFPETMERLKIWDGLKGLSIGLMMERFIYTNFLTAQGV  
SKLIDKLFFGGNLEFEIGNWFDVRFRFGWDASEDGVERRWRFAKSEWARWRVK  
EREPPKSPTIWWIILAGSLAPLAWFRGARGVIR

<SEQ ID No.:0305;PRT;Methanopyrus kandleri>

50 VEAPWVMDPELYQSHTVQFEGSGIPPARPSDPNAPQADRFLLVAPLWNEEGRHRV  
IIGAYRTETVPLPEDAKVCRVLVPDRVEVVETDNPFSDERGDPWAGILSAPRHFKKP  
VPTGPWHEVKYLTLEHDGILLIRPERTADDIFAAEADLPTRDGWVRIALTPGNWLVL  
LGWSKEFNLLTVDGKTVFRGRVPYNEVKYDLDGVSVMFWYCGYIDLKGYKWKFD

VFNSGTSRECWMLMLHYIDNLVSSKSNKASTDILNFHPLLQYKIGILYGP G IILRINTRN  
PIIIIEFKAPKPRDYIKYGYKEFYSDKYWSNSLSPLEVIVSQILYGVICPVITPPILLIHRR  
RR

5 <SEQ ID No.:0306;PRT;Methanopyrus kandleri>  
MDGSSGLSMCFHLVHEIGRKLDDVEDIVDDAIRLCDEFLLQDKLDVDEFKKRLDDMLT  
RGGGIVGNSGDVKDAAYSIEQAVEATVARVSDLLEKWSREDESKARYERLKD KLEG  
LRGWVFGGLALSLLAGVLVQLAPQEAKTTLLQALSAITQVLAVVLQLVQVLHG LLPV  
PISA

10 <SEQ ID No.:0307;PRT;Methanopyrus kandleri>  
MAEVRLEPVKEVSPPLL RVVRKGV EERELVINTSKCAACGICEAACPVGAISVAPPS  
AVVRKGEDPIDVDESKCVLCGICAFVCPYDVIQLLVNGKPMTEAGLPNLPKSVEVDE  
EECVYCSLCADTCPQEAITVEREVPTPGDLVMGEIEIDEEKCIYCKACEEACPADAIT  
15 VERPKPSAADPEPEFTIEVDEDKCVYCGVCMRTCPVDAIKVGC MV CYGTT RGEIPA  
KGEVDGSVDVDPSSCVYCGWCGFVCPVDAIEVIKPYEGTLEVDDEECVGCGLC VE  
VCPCGALEFEKGGKAGKTKIVAHPETCAYCGACARACPVNAITV VREGVTAMP ELP  
TKAWKKALDRVLGPVEKE

20 <SEQ ID No.:0308;PRT;Methanopyrus kandleri>  
LTEASFDGKYVKRVFGVPDEVVDGAVVRAWDIIRERRSKGRVRI RRPDEVWPIGRA  
VARLASVARVSVRRVKGVECPEDALDQVLGDAEPSSPALRTL RSLTRGRCTIGFPV  
LTPELTLVWVGANTEE LSSSVLDLTHHPAVRTLVS LAVLDDVGEYLVDRYDDRAEQ  
25 LSEALQRAYDGRGARLLGLCLCAWLSEKLGGEFETWWNEG GGW RALYSV VRESE  
LVESTVRERVGVEPGK

<SEQ ID No.:0309;PRT;Methanopyrus kandleri>  
MPRARGGCGLPSREPAAPFLVGFTAYKGGTGKSTVAFNVGLEFARYYQGF DGVPR  
RPVFFDLDPQGRSDEGGRTLKKMFEDGPFRLRSLHSP IELDVQVVEYDPDEPVP  
30 VDGVNGSFGSYGLVDSASFAPALLAVPKNIRIRRVKPLRRLLAAANELLFQYLED R  
GSLDSKLREYLSSPPLGVVDTPPMNAASDTFAGILTQVDLVIPV VDPENVRQLSLFC  
KLYVTRLAVVNRVPPDGLTREAKFFDGV LNRILNKIPLNKDEVVKIPERPVIRFASAL  
GIPVRARPDKRHSGYFREVARHIRADWNRRRYGSGVRI

35 <SEQ ID No.:0310;PRT;Methanopyrus kandleri>  
LSPTSSSGSASPSAPDARPD RGFPPTFTASRPTSRPPTSPVSSTPGPPSPTAPPTT  
PRVTLTMTSPARHRDGLAAFM RDVLDLLVTLGVHAVATGPSGREYLRTHLHIDGDT  
HVGFLTDVGFYPYHTRKRREAHRLGTRLDHRIERLRAEPVSDPPEPVLRDPGLPDR  
QGTYLRRRGLLP IALDDHKIPLLARVLGYALGDGSLHEIDGQLRLTFAGEPEGLRDLA  
40 DDLATLGVGTGLRRWDTKDMVELHVHSAFARYLELLGM PRSPKVERVYGVPGWI  
LRAPPGVKA EFLAGLFGADGWLTGSDGRYAIGLTQAKSAVYLGSLHLFMTEIG EML  
EEVAGCRWGLNRERCYTTEDGKVRVTERLFICGREDVMRFLSDVGFAYSRAKAER  
TERALKALGGSVRGIRLKYREK

45 <SEQ ID No.:0311;PRT;Methanopyrus kandleri>  
VGRAPVLVYRGAGHVALHVVRGGAAAGWGIVHAGEPV TIIPGVVAEE

<SEQ ID No.:0312;PRT;Methanopyrus kandleri>  
VTTQONGKPITLQPF TIPRLPFRARRPHRHGLRTVPHALHPARARSHARLHPRRDR  
50 GPLSGQLLIARRVLFYPPVPTTLQAEIERPTNYRLNGKQVSFWVPAPDV KYEVRS  
MVKANGQLSFQHVQGVSERQGIVTVELQGDPEFVGVLLRQPPRVAYGVRDRVRLS



LRGRGPAARGVKVSWRADGERTRIELSGSGRVLLGLILDGGAMDVRVDGGSVLET  
GPCRAGGVTRSWTWVS

<SEQ ID No.:0313;PRT;Methanopyrus kandleri>

5 LLLPALLTLLLLPGPVAGAPVDHAVDLPSEGSVSGGDLRECVEAVLDSCSSVRWC  
VVRAPGVEEGAVFERCGERWVEVSGDCPGRCGVLLRGLDAARVSWASGTLRV  
GPVGASAWLLVPDPRGLRVGGTFLQGGAYPEGAGVFRDRRVSVRRGRSRCPGR  
CRLGWLASRW

<SEQ ID No.:0314;PRT;Methanopyrus kandleri>

10 LYGVHSTFEDVAKAAIPKFRTTPGRLLFAGFMAGAFIAGFTLATVAACVAKCPPYV  
MGGTFNKPLFKLLLGAFFPMGLIAVVIAGADLWTGNVQALSSAKGMGYADWRNVIY  
NWFGSYGGNFIGSIFLALMAIPLTGLFGKVGAPNLFQGQTAIEIAKAKVAKDPISLFFLG  
15 IGCNWLVLNLA VWQAARVKDGAGKILAIXFPIFAFVAIGYEHAIANMMWVIPTGIIASHYKI  
TWSQFFHNLMPVTLGNAVGGFLFVPFYWYLSHPELSTKR VYKELLDFVAVTILFFIL  
ATLIPAGIAYGLDAALHKASMYVPTVLSAYYVAGTFALRRLVKK

<SEQ ID No.:0315;PRT;Methanopyrus kandleri>

20 MAMPVVLRLDPWCGTVVDCHDESGERLTRVFDVTDVKRSQVKRADAVIVTHPY  
RDHYGGVPRTGPEVVYSDEVTAALLELEGVDPGRLERVKRCFEVGVFVETYPINH  
AVPEARAVLLEADARALITGDWCALGEHPPLXEQVDDEVLDVLVTEFTRAASVHPDD  
LETAKARLQRLLELHRDERVLLLNPVNPLVGAAAETVHVSRXDEHAVNVIRRAG  
AHPGGADVFTDRPRYPLLLSDPRLIEERLPKEPKVITERWFLYRSRKVMRELERS  
25 VPPYYVSETGHATESEIRRLVEELRPRHVILRHGPLPSRAVVTGSWFGRGSRSW  
TFRCG

<SEQ ID No.:0316;PRT;Methanopyrus kandleri>

30 LINEVYLVDGCVKAYPSELYLTWSRGAVANLTREPIEQKPQEWSSMLRLTAAKIAP  
VLKLLCVLPALLELIKQST

<SEQ ID No.:0317;PRT;Methanopyrus kandleri>

LKRSPVAELFPEAFSELTPKEGEVVANPARQEEPVLEFEEGLRKSFEAMRECLPK  
DGRLTVMFTHRELRAWDTLVRALRDAGFRVNAAWPVHTEAQWSLYQRDKAAARY  
35 TLILACDPWEGDGEV

<SEQ ID No.:0318;PRT;Methanopyrus kandleri>

40 LGVFWTGAGGPVRVVGELVAEDLVPTTEEIPKYDSERVLSKGVDRFYKLFNERQLLV  
HAELLGVIRELCEGLDEEYREPLTVYAMIAFDKMINYNTICSRWHYGRGAVVGIFDQ  
HAYAWSWDHGMGAVPGWWDFGVKGVLEAYEEFIRLLRGVKERPRVILGDARKL  
PTLLEEKPDITIVDPPYYTTSSTPSSPTSSTCS

<SEQ ID No.:0319;PRT;Methanopyrus kandleri>

45 VQLLKGRRLRSVVIKVGEEPGDREREALKRAMLKGCLDRILQEPVTMNAVRVKDSH  
PPELVVVEEA

<SEQ ID No.:0320;PRT;Methanopyrus kandleri>

50 LPGRGCAHDEDPGHGPVHEDALRKLEELGEVVLEDADEEGLRRHVRDADAWVVR  
SGTQVTRELIEEAENLKVIARAGVGVDNIDVEAATERGIVVNAPESSISVAEHTMS  
LMLVLARRIPQADRSVRRGEWDRKLFMGVELAGKVLGVIELGRIGRQVAKRTKA  
MEVIAFDPIYISSEVAEGLDVELVEDLDELLRRADVVTIYVPLTDETQGMIGERELKLM  
KESAFLINCARGEVVDEEALVRACSC

<SEQ ID No.:0321;PRT;Methanopyrus kandleri>

VARMRFVPQVCPFCGCGCGILVGTGDEEIKLLEPWRRHPVNEGRQCCKLWELPEA  
VQKDRLERPVRMTESGEPRELSWNRALIEVAEVLSTHEPEEVYFVTSKATNEDN  
YVAQKLARTLGTNNVDHCAULHAPTVALSELLGSGAMTNSIPDLVEADCYLVAG  
5 SNTAEQHPIVYRRILQGLEENDADLIVLDPRTQIAELADIHLQVRPRTDLIVFLYMAK  
VIVEEGLHDGTFIEERTTGFESEFEEYVREAVSEGVDVRRRIAGVDPEDVRKAAVRYAEA  
ERGCILYCMGLTHHDIATRTRVRLCALALLTGNVGRPGTGVNPLRGQNNVQGACDV  
GALATHFPGYRPINTETANEMSKIWSFEVPDEPGLKLTAFDADEITVMYVVGENPA  
VSEPNTRHAVEKLESLEFLVVQDLYLTETGELADLVLPAGWAERTGTFTATDRRV  
10 QLAEKAVEPPGEARPDWWILEAVARRLGLKGFGHRSPPREVFEIIRRVVPQYRGITY  
ERLRRRPGGIHWPCPSEDHPGTPIHTEEFATEDGKARFPKPEDVEYREPERDVDE  
EYPLILTTGRVYAHYHTRTITRRSRLSEEVPESFVEIHPKDAERYGVRDGLVWVET  
PYGEWRCRARVTDVRREGTIFTFPHFGENVLTPHDVRDPESGIPEYKYVPARVRPD  
SRGSASRG

<SEQ ID No.:0322;PRT;Methanopyrus kandleri>

VSSVEVQVGGCYLARSSDPDTVKEAACGGVVTPELLRHALLREDLVDDVVCVERGAD  
ALDGRPIVVDDPAEVPSGSYHCAPTQLARLVAELHREDPTLRVAVTCRPCDARTLD  
RLAERDLVNPDRVYRIGLNCGGTFEPRVLEILEEHGVDPLDVEREEVVKGHLVIEL  
20 RDGEEISVSIIDELEEQDSGRRENCRRCDENIPERADLACGNWGVPPDLQGEWTFV  
EVKTEDGRDLLAGALDAGTMEVQEAPGKSVQIRAKIDEVMRKMARSWREKTLDED  
WLTEAIEALDRCIKCRSCRQVCPVCASCEEGCWSFAGRESVTPTPVWHAHIAQCV  
ALYCVCEGACETACPAEIPLTRIYSVLRRERLPDVVERLAEPAAE

<SEQ ID No.:0323;PRT;Methanopyrus kandleri>

LRAGLFRERDHRDPFRRCAQGRRPTRHRLGDVRAVRYLRRLVPVRRDHLLIDGE  
PVTERGVPKLPKNVEVDEDRCVYCGVCMRTCPVDAIQVTKPYQGHIEIDDEECVGC  
GLCVCICPCNALEFGDGTAEKTRIVVNLDRVLGPTEKE

<SEQ ID No.:0324;PRT;Methanopyrus kandleri>

VAKILVTDPIHEDALIKALKEGWAGLACWVGVDGEGPAAVLREAYRRVDVHPVRGVV  
ALAVLEDAAGVLLEGLGEGGGAVVGVFPSPGVERAIGSASRSVPLRVVVGAVGGVR  
GVVGGRRERRLAGAVLSDPSE

<SEQ ID No.:0325;PRT;Methanopyrus kandleri>

VYRTSSPGREEVLELARQLMRNLSVLKTLTEVSDLPYKKARRLLARGLALTFDAR  
PSESPRIRDILLEELPNRLEPFLVRTLEGWPAHYSAHLKRIIRRRKSLDGKHETPGVKL  
ELERWKLGHVP

<SEQ ID No.:0326;PRT;Methanopyrus kandleri>

VRIVDWCALDPRAYDEGRRRVAARACPDQPYPVWNGEPLVFQTPTLIFGDRGDGK  
YPIAWLLKIQAPSDKRITELDFPERWWKGGLLWILAITELAEDGRYYSVFPEEDLLW  
DPYRREGCPYTPHSDLDICTRLGVFPALRYIDKAPAPTPDMLWKAYVRGVPPDD  
GVTTDFGSLVHGTQWYTEGVSKATEGLKLALSALTALYDSAAKRAEDLGLKAYRA  
45 YPAVVQGVVWSSDSSQLLIYQPTLGVSFYDPPVLVRALNSYASALLAAEDLVLRIA  
LGRPQLAPWQCDDARLENQLREEFVRKVNEELGLNEATVRDFTEAIDRGKEDFESF  
LKRTGVVKVDAEVETALSTLLARVCGLSTEATVYTYYSMATGEILPLVITPRALPSKG  
GVTTGSFCSTLTDNLRKAEPGFTASDDLSTFKYYFNNPLINGAMATLLSWGIEWAI  
LSAGLIAGPFPAAELLVSGAPYLAALGSSAIMALLDGWLNNRTWDQVSEEIAGVAA  
50 AGTAVYRSVGRYISKISEYADTTASKIARYYDFSFNWSANSILAATSNLWLIGG

<SEQ ID No.:0327;PRT;Methanopyrus kandleri>

LPLALIYIFFASVWLWPISVAIIAVKWRRARKILNEAIGSGTVGPYGGVNGETGVRLLS  
TKVWVYGGIFDFPPIGLPVVALLSAVALGKGWENLTACPGIRNLSMSLLTWVFNCS  
LLGIVGKLVWYLRRLKRLDVKFIAESKKKVNRNIKKICEKYKYIDVYSAFNVTLMWVY  
NIFAGGIIVSLFTLIFYLTNTKTLLIHRYYYNILTVSISLVILTNSVLIGLWFSRRKYICSPK  
5 IQSNSIIYLTIAVTIYTSVISCAMFEYVITGSL

<SEQ ID No.:0328;PRT;Methanopyrus kandleri>

LSDDKRSYARPLGRTAMFVVASGGYYQLYWFYRNWKDFKEYLGRDNNVLRITGL  
FVPFVNLYLVWKQFVEINELLEAGLDPCPTKILYPVWFGFFAGNRGIFHAETRVD  
10 ALGAIVALMVSCVPLLVVQKKLNEYWREVQGLTPTWSVQGRADGGGGVVPADM  
GRVADLGVNARSRRTDSGEPRAET

<SEQ ID No.:0329;PRT;Methanopyrus kandleri>

VPLLTSLVEGEWAPSHDPRMGGLGLAITGLLFLLPTMATAEVVWGPLVTLVTALNA  
15 WYAVKALSSGPSPLVPLALLEPGLAVLCVCEPVRTWLAGIPKLAVAGALICLEGPVD  
RLFRVDEVSDGDARADAGRSPIPTGSA AHLTSR

<SEQ ID No.:0330;PRT;Methanopyrus kandleri>

VLGAALAAILLVLPGSALADAWSPVSKVHLTERTELTDQNTVRAHLTVEVLGYGL  
20 EGSTRVPIKVLVPSDAELVTAKWKPERGGEEVEPVSVRTVTWPGNRDQIEWVTY  
NLHSGSTPYMDALEALFPNKMIRWRELTFVLPVEGTGGYDEQLGTLEVTTCTHE  
GEQGTYFAWPIAAANPAYEVRVHGLSVGFVAVYDPETGRWRWIVPGEWSYSAP  
PSSRSANVNTVIVDVAGLPFGLSVEAGGVRVDPGPTWKASRFLSLTRYLPVLVMEI  
SPVGPAPQRGETASERGTTTESTGGIVPTPLIVPIVVR

<SEQ ID No.:0331;PRT;Methanopyrus kandleri>

LVGSHVPIPHDPVERIRALRVLREYRRGKKPSLEVITYRTVNGSTCGPYVARWRR  
DSRHKRGRITLYLGKPENKSVRFVEWLVS LDREEVLELARQLMRNLSVLKTLTEV  
30 SDLPYKKARRILARGLALAFDARPAGSPGIRDVLEKLPDRLESFLIRTLGGWPAHYS  
SYLGKVIHSRRKSLDGKHEIPDVKLELERWKL RHGR

<SEQ ID No.:0332;PRT;Methanopyrus kandleri>

VPLNVSRYFALAPGTGVSPKELVQWLLNSPPEVTIKETCFGAIADGPEDELRLKLA  
RAREEFGYAVFSKVRGYPAGDPRVCRTRGGGPRPGFPQLQREVELLDLIAEGLR  
35 ALDKGEEVELEEREPPVSADTIRKLAEELN

<SEQ ID No.:0333;PRT;Methanopyrus kandleri>

VTPLSTVVRAPATIANVGP GFDVFG LAVDGFHDVVEAHEADGVRIVTEDPIPTDPER  
NTAGRVALRMVEEFDLP GVSLEIRKGVPMGG LGSSAASAVAAVAIDREFELGLEE  
40 SELLRFAAEGERAAGEPHYDNVAPCLLGGFVIWRFEREYVRLEVPGDLRFVTVTP  
TGVRTTTEEARKALRERPPSLDDVNNLSAVALMVHALHEEDAETFARMVGWDRIS  
EPVRKRFPVPRYRELRETAYGTGALGFAISGAGPTVFVAVCWREDAEDVRTALEDVLD  
GKCVSAVHRVSDGA EVA

<SEQ ID No.:0334;PRT;Methanopyrus kandleri>

MNDLLDPIRGIPVDLELVRRELDVDLPTARYLVRTGLITTDGARVLRRGPTTGTCATA  
AAKAAAIRLLEGRTVVRTVRVRLPVGTVIGVRISRVGGDPSEARVRKPGSDDHVDVTT  
GVTIAARVEETGSEGVEIRAGRGVGETPSGKPAISEAVREQIVDNRLRYLVDSYGVGL  
RVTIEVPDGEEIARKTLAHRHGIEGGISILGTKGLVDPNSEEAIEGSIRSDLRYVERVP  
50 CLVTGYRTMDRARRLGIPSRDIVNCHGRYDLALEAVKTGVPADGEVKRFDVAVLIFG  
MPGKLLKLAAGAYNTHAKVADARRESLVTRLVEIGRPDLAVEAARHEGLISEFLRSL

DPDVRRELFERVCCELVEERVSSDHDLECGCALYFRADDSEEVVEGEGWKRLVRGY  
DDDLIGRPKG

<SEQ ID No.:0335;PRT;Methanopyrus kandleri>

5 VKPVSAFKTLTLRVYWDEARFEVLDQTELPDREVVRECTSYEDAAEAIENMRVRG  
APLIGAVAALGAWVAYERDEDEDYGEAIERLRNTRPTARNLFWALERMEEAKNPRKEA  
ERILREDVEVNRELGDHGAELLPDECTVLTHCNAGALACVDWGTALGVVRSVFN  
MSKEVEVIATETRPVQQGARLTCWELSRDGIPVTLIADTAVGYVLASGKVDIIVGAD  
10 RIALDGSVANKIGTYQIAVLADRHDVPFYVAAPTSTIDPETETGEDIEHRSEDEVKN  
VRGVRVAPEDVPALNPAFDVTPPELIDAIITEKGVVEPQEVADLV

<SEQ ID No.:0336;PRT;Methanopyrus kandleri>

15 LFILVTSNFLSFNRYTVTREELFETGYNLVTKLLKDPPrPYHTVKIRVNGKKGKVLTH  
AGEPVLVVFAGYPGVSEDAKFVEMNGKEEAIKPGSTVNLDWEDPNEVLSNVTGFF  
AGSRYHYEQSVVLGASLTLSTVLPEDLIERLKLGPpKKLPERAGGEELKVRRTS  
SEGILSSIRLLLLRFRQ

<SEQ ID No.:0337;PRT;Methanopyrus kandleri>

20 MNRLDVMILKILAEADRPMSGRIAEIEERFGEKYSTRSIRYRLQKMEERGLIRVR  
RNDRVVGAEITEWGLTMLKTETSSERVGMYSISLIEEMAYRCSFDPEVMKGKVCNI  
SVVKREHLDDFLDAVVETIRAGISPSPLVAVKEDLSDHDVEVGEDEVAVLTVCSVTI  
DGVLINRGIPVTPVCGGLLYLEDGEPLGMQEYIKYEGSTVDPLHVFVAKGMTQVER  
VLETGTGLVPANVRYVPWAALEDVEHVERELEKADIRGIVDVPKVEGEILGIPLPPRS  
25 LGIVAYGGLVPVALLERGISTRTYPTRTLVEYSSLEDARRY

<SEQ ID No.:0338;PRT;Methanopyrus kandleri>

30 MPRLRLQNVYKVPGRGRHQLRIAGKSIPGVSPLADEVYTVDFKKRQKENEKVEKV  
MEQVESKDVKFVRLQFVDIHGFVKNFAIPAERLEDALVEGVLFDGSSIDGFVDIEES  
DMIAMPDPDTFAVLWPWRPREGKVARIICDVYWPEGKPFEGCPRLNLKRVNMNELAEK  
GYMMYCGPECEFYLLKQDPETGEVEAHDEGGYDFDYPLDRAEDIRREIIFAMEEFG  
LEVEMSHHEVGPGQHEIDFKFADAVTTADNVISFKQIVKAIARKHGLIATFMPKPIYG  
ENGNGMHVHQSLWDPEGKENLFYDPDAEDQYYLSDTALYYIGGIMEHAHALCAVC  
NPLVNSYKRLVPGYEAPVYIAWSPKNRSFIRVPAARGKATRIEYRSPDPACNPYLA  
35 FAAMAVAGVDGIENKIDPGDPVNENLYEMSEERKELGIEHLPENLRDALEAFKEDE  
VVQSAFTDHIVEQWLELKWEEWSEYRERVTKWEIKKFIVY

<SEQ ID No.:0339;PRT;Methanopyrus kandleri>

40 MFPRTLIPILISAILLATPACATDVGVFAGWGSTIRSEGVQKFTDDILSTGYTEVAVLIRG  
VSTPTRVDTLSAVYSQIKARNPNVKVYAWIVGFERKDGWDKPWDPEVRREILDAVR  
SALPYCDGIILDDSFYPTSNPVKREKAMQAITDLVREISELAHSHGKAVYFCLLPEK  
PEPYSIDRDAIATYVDKFIVEAYTEEYGRDDEWPVRVYNLYERLYPGKVAIALHELNE  
SRLAHQLTLLKEAGCPDIWLFYRYGEVKKMGLVRDVIRSITGSASGTSLQWSPVEGG  
QFDLAGLLLTGLVLGTGGVLVAIVNPELLNSLGQAIGIAETAQELLQGAFAVSGA  
45 LSGIQEKVLGASAEGDLGPIIGILARVALVFVWGWLLATLLSII

<SEQ ID No.:0340;PRT;Methanopyrus kandleri>

50 MDRSGYRGRDERPASRILWMKIEPGTDSVRVFTVRFRGRPDYVAAWKQPDRT  
GADRSVIVLSTRGCRWFHETGGCVFCSYPLEGAGTRVPELLIRQFERAYSRRHP  
DSPHGVLKFTSGSFLDPEEVPDEAVREILGRLAENELVTEVSFESRPEFITDERLELI  
TEVLDGKSFEVGIGLETSDDELASMNKGFSFREFAKAVKKVREYGGIPKAYVMLKL  
PFLSEAEAIRDAYMSCVDAHLGCTRISICPTTVHRETVEKAWRVGLYRPPWLWT

CVEVARKVKGTLGDRVDLLVDTSGAGTPRGPSNCPRCSSRRVARALREFTRTQDIG  
RLEGLKCSCLAVWRTHIVC

<SEQ ID No.:0341;PRT;Methanopyrus kandleri>

5 MLCAGNGGKELPRAKVFEGGSLVSKDYEDLKRRYFGTEHGNVLFDPFETVYLTEK  
GEIDPETPEGEPMSVEELLSFFERRRPGFRAGYVVYRDLTERGYVVKSGFKYGG  
FRVYEEDPDREHSKYVVRVVEPDTELSTRDVLRLATRLAHSVRKDFVLAVVEDVEEP  
RIEYVMWRWKRL

<SEQ ID No.:0342;PRT;Methanopyrus kandleri>

10 MAEQKPYYGAWPCHPRDLVEEGVTTSSARRARIVLRKYVLGQSEEEIAEEEDISLKS  
VKYHLEKAEEEGLIDYVKEKFVESE

<SEQ ID No.:0343;PRT;Methanopyrus kandleri>

15 LIDPWDVEEVDYERLTEEFGIRPIDEKVRELLPRRFPLDRGIVFGHRDYDSFLKDYN  
DGKLVSVLSGMMPSGRMHLGHKTVDQLVFYQQEMDVKYVPIADLEAHHARNM  
DLDRAHRIAVEEYVLNYAALGLDLPDRCEIYLQSERKTVQRMALLLAGRLTWNTVK  
NTYGFTGETNMGHAFAPIVQAADILHPQEIEGPHRVLVPVGVGDQDPLRLTRDIAEK  
20 EDLIKPASTYHRFMTGLTGGKMSSSKPNTAIFLTDDPETAKEKVVNAKTGGGATLE  
EHREHGGNPDECVVYELMVYHLADRIGGDEKLREIRKKCREGDIICGECKRMVGEA  
LAEILEELERRREDVRDELPLLSQHPDAPEVPEDW

<SEQ ID No.:0344;PRT;Methanopyrus kandleri>

25 MIPPFQALVTCAGFEFRCVEELEDILKEQDPYAEAEPTYFKGVVVVRSDLEPEEIVE  
MMKDAADTDWVAKIVPIHRTVRADLDVMKRTATILARRKLDENTSFVAVRCRKRGGPP  
FGQREVEVEVGAAVQEATGAPVDLENPDYVWVIEVLQDTAGISVPPDLIVSKEVK  
RVRKWSPGMRPISRAQLKLRELLKRHPYIVREGSDVIDLGAAPGGWSYELARRVEP  
GTVYAVDPGDLHPKVLKLDNVVHLKKRAEELTEDDIEGRILVTSDLNRIHTEATEVT  
30 LSVADEFLEPGGFIVQTVKLAVDPSTGEYAAPDVETAVSEVELEYERRGYEILAIERL  
KRNTPNERTLVARKV

<SEQ ID No.:0345;PRT;Methanopyrus kandleri>

35 MRLLKAGDRIQGGPWEGKV/TAVLDDVGCRVWITSSNPENVPKRVRGGGTVCELAF  
HDPVGGFAAYWVEPDHSEATDVGSPEEGTCAVHIGNRWILAEVLEVGRRELSIRIP  
NVAIPGPGDAGAPVAQNERVVGMLYMYFLEDDCVGRAVRMDVIEERTERALKRLR  
GRQRARSIRP

<SEQ ID No.:0346;PRT;Methanopyrus kandleri>

40 VPVVFLEGPLSPMDHAYEVMARCVPNGREIFEVISFYDDVVYFEEQREGYEPGTT  
LALIVPFLVHGVTEDDLRRVSEDATLTPGARETMRELDATPFVASTSYEQHAMRIA  
GLVGIPRGHVYCTEMPLDDAPEPSEEERRLVLEMEREILRKFYPPSDADKEELVESV  
DDFFGRLSETELGEFCSKIEVVGGSRKARVVEEVVDLEDADVSEIACVGDSTVDVM  
LKFVRKRGGGLAVAFNGNEYCIPEADVAVAAPSLSAVLPILETFFEEGKDEAMELAEE  
FEPEGEARVLNVNRARQRELEEFIRYSEAMRERVGEAGKLG

<SEQ ID No.:0347;PRT;Methanopyrus kandleri>

45 MRGLEEKIRTLQLPTDVRWC PKRMTDRSRGRRWYAVRGSDAVRVVLPVRVSRRD  
FKKVPKGAGDAAAHPIIEEIKRRSREEPDLYPLSGKLLDHKKVRKLTEPCTVRLHGF  
RTPPLWMPGKSNRVLRRLRSREVLTVRMLFPPDWSEERVLDGVYAALDALREVVREI  
50 PRKEILRTCDVLDQRELRLERLERGEIEHRGKRVALIGDGARPARRLTDVRRHHRI  
AGPKPEPHIPFEVPEDPDADLVPLEIELPRTGERKRFLPIYEGELFAIAGANAQGKTT  
LVNAVEAGQDDHAPGDGREYVITVRRTAKAEAGIKRMNGEDVSLFFRELPPGYEGT

PENVRGLASGSMKMAAEIQRAL EEGAKILFIDEDKAAVNLLVPGVLTKELEGIRTLVE  
VRDEITSRGVTIVAATGVLDDFTAAADRAIVMEDHRPKPLNLREFRARLARYYLERA  
RRYRSDAEGPEGG

5 <SEQ ID No.:0348;PRT;Methanopyrus kandleri>  
VNARIYAAASVLCALLAASVQWDVLADLPEAWRELNAATELAHKALEEKKKGDEL  
MEEVSATVNAARSAGPLALSVNAPRILEDLHGAYVHYARAVDAIDA AVDHLDRTLD  
MIGATADPEIKESLKLMEHGVSHYRMALKEFKLGVQAADEGDVGEAFRHNAAAYR  
MMREGMKLFSRGKAELESKTLLFMG

10 <SEQ ID No.:0349;PRT;Methanopyrus kandleri>  
MYRTLTLVLSTTLMAVAAAERLDPVDEDRPHILNVYIEGHEATCFGQGIDTKRLET  
GLKHVPEVPTKGEFTVTVEFNTGPHPPERLAVELYFPSWLMVPPKYDLKLPEKGV  
DHPEPNSILRADLEVKVGEGPNPLSIGDEYYLVAVLRDPTKESDVL DYVVKLRFRE  
15 PRGGESTPEPTLLKVTR SALGDVSVPVAGFILGSL SALVAEIVCGWIHSGPAALWAT  
VIGGLVGALLVSI

<SEQ ID No.:0350;PRT;Methanopyrus kandleri>  
MLHDPNDPSEYVIYVIDRGSSSGLRRIWGDEIQDVKRGFLVLWNAEIPVHRVIRVE  
20 RGGRVIWERGRRARGRR

<SEQ ID No.:0351;PRT;Methanopyrus kandleri>  
LVSLSPEEVRRKCSEKGWVTMYERIATLTDEDRERVLLIEDHPTPVGAEWVVRNYE  
ATSPLEKAWREGKRHFLLRVGEASLDLEPSVRAAGVESVEVRDGEVRVTHAGL  
25 AGAGVGAALS RGC AEGVSRVEIHEEGGGSRLGRATVVTPELRRLVIGVDDTDTEEE  
GATWSAVDVICRRLEDEAGVFYSRHVTVQLYPKTPHRTNRNCAAVVELGVPTKRVE  
RVKREFLRMLKEVSFS DHTCAAFWDRLEFPREL RDLGNAAKRRIVSREEVDEVVEI  
CEIEVVSIGDGERGRIGAVAALPFIDDHGLAARVPR

30 <SEQ ID No.:0352;PRT;Methanopyrus kandleri>  
LAETIVRKFDPNKWVLVPTRHALERLRKRELSPSADVPEAVHALRRLAŠTTKVLIN  
DVWVAVGTERTLVLSEMR TMSLEKYQDELKRHL SRLHPTYTVYVITAEGCRPTSAG  
QLDVDDLATEFEYARFSGEARTLV LAREGEKALAVTVRPPRKKERKLIE

35 <SEQ ID No.:0353;PRT;Methanopyrus kandleri>  
VGNVPRCRRCGYSVELPLKPCRCGEPSFEVAAFQVYPEDVRYVAVFVNESDVHTI  
HQSFGQDPDGIMLRNLVERLGELLHSAAPRAATAVRTPPWIVDVVERISGVTVRTV  
RDDFDVVRSLQAELRADRR LDRVEEPPERKLGGSHSTIIGGRRGRELVLKVASVP  
YVKRVIPGRIGAKSGSGGGGVRLKVS RVDDSGNVKLLLSEGAATQEIFVVTARDE  
40 REGKLVAELLERVIR

<SEQ ID No.:0354;PRT;Methanopyrus kandleri>  
MIMEILNRHKEKLVKLRVLSYGDRMILSAQFSANDFDEAYEMLQEIMEEPEVVSLD  
SDRKQGYAVTLMEDVTEEYQEIRERVHELMRELVEGGEGKEEFPLPIFEA  
45

<SEQ ID No.:0355;PRT;Methanopyrus kandleri>  
VDEKKIEELVSKVKGEIKFHEVEKYTDGDSEVATEVRRRALERLTGAKLEHLGKYTI  
DANRAMDKNIENMIGAVQVPVGIAGPLLHGEYAEGEYYVPLATTEGALVASVNRG  
CSTITDSGGAHVRIVRDGMTRAPVFKLPSARKALEFCEWVRKHFD DIKEVAESTTR  
50 HGELLDIQEFVGRHVFLRFEFDTKDAMGMNMVTIATEEAVNWIEEKYPDAKCVSA  
SGNVCVDDKKPSWLN NVLGRGRTVVAEVEVPRDIVEEKLKTTPEAMAEVNYRKNLV  
GSAAAGNIGFNAAHANIVAAIFIATGQDEAHAVDGGSTGYTTMEVTE DGDLYASVTIP



SLNVGTVGGGTGVETQRECLEILGVAGGGNPPGVNAKEFAEVVAAAVLAGELSLVA  
ALAAGHLGKAHRLGR

<SEQ ID No.:0356;PRT;Methanopyrus kandleri>

5 LAISEILAGLSAGVAIEFAMPAMIRRSPLRLAVILGVIAAASCSLSILWPILRPVGAVS  
GLLTGILALAVRAEELKSGHFGAAGFSVRGAASYMLLISLGIYALL

<SEQ ID No.:0357;PRT;Methanopyrus kandleri>

10 MKPDRRLDVRGAACPGPSVMVAEELKEMEPEGQVLEVIVDSEGIANDIRELVQDGG  
HEVLKVEETDGDIRMILIRVGGVETDSTATDGTVRTCAGSLPSTDTDSVMIAQSTGVA  
NPERAYATFLMSEAALAMDLDVVIFGFMGVTVLVEREVERIRHPEFPPLIDKAREV  
LRNVEACACELSIQARGITSDDLDDGVKVVGASKFLKLITDPGVDVWWL

<SEQ ID No.:0358;PRT;Methanopyrus kandleri>

15 VPTVVRIDEFWDMTEGERRSVDAVTCATVGLMSGVYGILSFHVAEPGEVRRFEEVY  
LEGIRLPVGPCPNERLGLVECVVPATAHGDVSGAYLLRTVAEGNEFDVIAVADDGR  
EYEATIGPEELERAMIASTRACFRNYSIAFNDGERPASTIFAPRPLEPGEASFSGCG  
GYNPLEHDPKRLRLHRPGRRVLF CGAPGVITGKGTRSTRERPNTLHANLTECDPTF  
20 MGEYRTSAGPENIAGVASVIAVTEETLPFLERDHS DAVLPVVKLSDRTPIAETTYADV  
WVQETVRWNPDRCENCDCRLEEKCPYPYGDRLTGDCFHCGYCHEFCPAVEVDL  
GELEVEGRKLPIVARESSAYLAKKLMEIRAIEAVEEGKIDILRP

<SEQ ID No.:0359;PRT;Methanopyrus kandleri>

25 LASDRDDVDVLDILRETMELEEFAERLEDVDAEDETWTTSRKFREDEPRCD  
REFKKKMLENAPRSSDDGYVIAERAHWLR

<SEQ ID No.:0360;PRT;Methanopyrus kandleri>

30 VVGLGWAERVVRECLRLSEGERFLVLTDPMEELGRELFEEAGTDRALVVVDPR  
ETHGEEPPDHVAAMMRSSDAVAVTWSISHTEARRRACEAGARVASMPELTREI  
AERAIDVDYEELRRLSRELAELLTEASEVRLVTPAGELVMDIGGREALADDGNLRDP  
GEFGNLPAGEAFVAPIEGSAEGCVRIDGSAVPDGLDEPLELEISEGRVVEVSREDL  
EFVRLIRRIENGEMLCELGVGTNPGAKLCGVVLEDEKVYGTVMGMFGDNSTFSGRV  
SSRVHLD AVIKEFELYLDDELVARSGELLGVSL

<SEQ ID No.:0361;PRT;Methanopyrus kandleri>

35 VTRYKVG LADTTFARVDMASVAEVLKEHLPGVETPRYTVPGIKDLPVACKRLIEEE  
GCDLVMAFGMPGPTEIDKQCAMVASMGLILAQLLTNTHIIIEVFVHEDEAEDERELHE  
LAVKRAEEHALNVVKMLEKPEALTREAGMGRREGHPDVGPRL

<SEQ ID No.:0362;PRT;Methanopyrus kandleri>

40 LEGIRNQIERVLDPREGACGIAHATLEVLSWSGYRVECLEERLGVRARLIGPDGSVT  
EGRDVTWAPAILES LIKSGVYPEGWEERLSEVLT PERDMRRLARVFGYGRVLTVD R  
VAARIILGGGGTVIVRRRRLGSEVEIRYDGS KSDYVSYCPACALALAAVRHPQVYRE  
LKRELADAPNTGKVKAEDGVVNSVRVRRGIAFATLKLANSITNRGCCVAYAVRAE  
45 LKAGYGSERSKRLLRAYCDECPLKHCWVGKPISALGNVVLQRLTETEGGVRLKVEE  
YPEVVT PAGTGRGTL CALSACANAVLR LDASKVLKPDPSRSEAWGDDR

<SEQ ID No.:0363;PRT;Methanopyrus kandleri>

50 MFDPKKFVEEAIEELRREIGDRKAIIVSSGGVDSTTA AVLTHRAIGSHLVCVFDHGF  
MRKGEPERIRELLEELGLNLR FVEAAEEFF EALRGVTDPEEK RKIIGEFIEVFERIA  
EEEEAEVLVQGTIAPDIIIESERGIKSHHNVGGLPEKLNLDVVEPLRDLYKDEVREVAR  
YLGIPDEIVERMPFPGPLAVRVLGEVTPEKVEIVREANAIVEEEVEKAVEEGKMSK

PWQAFAALLDCKATGVKGDERTDYGWVIAVRIVESIDAMIADVPEVPWEVLRNIQDRI  
TSEVPEVTRVLFDTPKPPATIEFE

<SEQ ID No.:0364;PRT;Methanopyrus kandleri>

5 LAFVWIPSDVVEGKCVQLVEGDPERRTFESDDPVETAHQWSEFFPWIHVVDVDA  
RGEEDNSDIIGRICEEVDKAVQVGGGIRSAERAEELIELGADRLIVGTVAFTDKDDFS  
KIVDVCHDHGIEVFVALDVNENHEVLVSGWKEDAGVTLEDAIERFNEVADGYLTAV  
HVEGKEMGIDEKVVEKSTGATDLPVLYAGGIASIKDKVRAKEAGAYGVVIGTALYHG  
10 DIDPVALLDLMEED

<SEQ ID No.:0365;PRT;Methanopyrus kandleri>

10 VITVAVPNKGRLEPALKLLERAGIGVEEPLGRRLKARTTDPDIEVMFVRAADIPRLV  
EEGVAQLGITGYDLIVEAGAEVKELDLRFGRARLVAVPEESDVKSPEDLDGGTVA  
TEFPNIARQYFEDVGVDVEIIQVSGATEIMPRIGVADAIVDLCSTGTTLKVNRLRVVD  
15 ELLETSARLIANPDATDGEVIRRVYLSLKGVLNADGKCLVMMNVPRERLEEFHELLP  
GVTGPTVSEIYGDEDMVEVYAVVNEEDVSEVVLRAKELGAEGIIVLPIERMIP

<SEQ ID No.:0366;PRT;Methanopyrus kandleri>

20 LRLAILGGIAVTPERVIEDAGILIDEDGRISFVDTREQLEECEDWEDEIELGEKDVIMP  
GLINTHTHGPMTLFRGVADDMPLMKWLREEIWPLEERLDAEKCRWGAALAAMEAL  
KSGTTCLADMYFFMDAVAEAYAEVGIRAVISHGMIDLGEEDKREEELKESKRVYRK  
CQGMIEGLIEFSLGPHAPYTCSEELLKEVRRLADEWGVKIQIHVAETEDDEVKEVKRK  
HGKRPVEYLDEIGLLGDDVIAAHCVWLDDKEIEILSKRGVIVSHNPISNMKLASGISPV  
PEMLERGVNVTIGTDGCASNNDMLLEEIKVAALLHKVNKMDPSATEMLEILRMATV  
25 RAGTVFSSEKIGAEIEGYAADLVLDGSSPRLNPNHNPNISNIVYSASGSDVKHVFVA  
GELVVKNGKLVKADEQEILENSTECAEQLTSS

<SEQ ID No.:0367;PRT;Methanopyrus kandleri>

30 MTFTALTGVYSMQYGELVETYRVTLGDKTYEVPVEYYWKNNGNGHFVWVSLGVH  
PLEYQAHKCMFEAVKWFVYNSGEFEGTLVSWIKIPAEYYQSGSEEEKYRVSRDLG  
QLTFYNHVLPPYVLPKELGSKVGVPIRKPFLDVHAHRPSWGVSEFILIPAGPIHG  
NDNPESFQRALQICEVLGAVIGARVDTQQTGTSPWVTAPVAKHGIPAATFENGYY  
YIGQELPPNYDNYRTELDKAFLEALYLALEGGRPVPTPEGYRKLARWYAMAAETW  
GRTVEYLSKAAETHPEYRSELQRLAEIAAKIRDLLVEMSEECRVAELLERGRDEA  
35 ARLVDSELIPEYEEVTRLYDEYISGTRIPVRISDVFASEEHESGDYIEVFGVKLPVSL  
AATIAGAGILAAVITFKVSVNPLVGLIACGALLWLSRRWS

<SEQ ID No.:0368;PRT;Methanopyrus kandleri>

40 LVVVKEGEYAIRDPSLAPKGRDMIEWARDHMPVLGAIRERFEEERPLEGITVGMTLH  
LEAKTAVLVETLMAGGAEVAITGCNPLSTKDEVAALVEEGVHVYAWRGETEEYY  
QNIDRVLSHEPDIIVDDGADCIARVHTEFPDLAERVIGATEETTTGVNRLHAMHREG  
VLKFPVIAVNDKTKYLMNRYGTGQSALDGLMRATNILLAGKTVVVVGYGWCGR  
GIARRARGLGANVIVVEVDPIKAMEAIFDGRVMPMDRAAEEGDIFITATGNRDVIRG  
EHIEKMKDGVILANAGHFDVEIDKEYLEEHCCEKIDRRGGLVTEYRMPDGKRVYLIA  
45 EGRLVNLAAGEGHPIEIMDISFALQALSVEVLAKEGKEMEPGVYKVPKDVDRVAEL  
KLESMGIELEELTPEQREYMKSWEEGT

<SEQ ID No.:0369;PRT;Methanopyrus kandleri>

50 VRLWRLTAVMRLRNVM SRLVLALKEVEGGIIVGLLYDSN

<SEQ ID No.:0370;PRT;Methanopyrus kandleri>

VFLPEIDDRCHELAERYGVRPYMVARYLTFLGRSETERLLKHMEDIRPAIRNTILIDP  
EELRRVLEEKRGFELKRCPEPVDVGFWILNDPPISIGATLEYMMGYVPQDAASML  
PPVVLDPKPGDRVLDACAAPGGKTTTHLAQLMDNEGTLIAIDVDPDRMRALKSNLAR  
CGVANAVALRMNALDLPSTDWEFDRILLDAPCTGEGTIHKDPSRKTSRDPEDIATCA  
5 RLQRRRIDAVVDVLRPGGVLVYSTCTFSPEENELIVQYAVDEHGLEPEPVDVGWAD  
RGLRVPGVPEPKVRRTCARLYPHRHGMGIFFFVARLRKPLS

<SEQ ID No.:0371;PRT;Methanopyrus kandleri>  
LGALEEFWKLAEHDVPIPVRRQDAVALYRVLLETVRWGIEREEGVRESRSEVRARI  
10 SCEGLDCAVLTKVGEDRPQLLLRTVLGPRLLAEVFERAHESGVRSFHFDDLQGRGLR  
VEGEYDVGVQIKVVGGGAGWELLEDLEKRGFSVTGL

<SEQ ID No.:0372;PRT;Methanopyrus kandleri>  
VHVLIASGDGGHLTRALALAEELSDRGHDVTFVAVNEDSDQAVERLKKAGFEEYVGL  
15 PRPRRMGDTSWKAALGGLKNYLAASKVLRDVRPDLILSTGAGVAIGPMIAGKFKRL  
PVAHYEPTDVSVSGKVAKLCADIIGVWDEDMAEYYGDRVINVGIVLPRSFEEDPE  
EAREKYDLGDRVLVWTTGSAGYKPALEGLVRCAEEGLLRDWEVVNTGNAMDPK  
RLKRALNGLCSGIVVKRFFHDFPALLKAADLVVCLGGATPVEAAALGKPVVLPRRD  
20 VLRDHQYVTAKKLEKRGVAVAAEDASNPEEVVKAVSRALSIDPEDLKRMMGERGKEL  
FGGNARERFIDLCEELVASG

<SEQ ID No.:0373;PRT;Methanopyrus kandleri>  
LGVQVGIVGKPNVGKSTFFAAATLSPVETADYPFTTVDPNQGVAVHRTECPCKAFG  
25 VECQPRNSSCIDGNRFVPVELIDVAGLVPGAHEGRGLGNKFLDDLQASVLIHVVD  
VSGSTDEEGRPCDPGTREPAEDVRFLERELDEWIAGILRRDWDRTAKRASLEKIPA  
AEVLRERLAGIGVSASDVESAMERA EVPSDLTKWSDDEDIRRFAREVRRVNKPMVIA  
ANKIDVECAEENLKRLEEEVEYPVPTCAEAEALARRAADQGLIRYLPGDSDFEILQE  
EKLSDSQLQALEFIREKVLKRWGSTGVQEALNRAVFDVAKMIVVYPVENENKLSDS  
30 EGRVLPDALLPEGTMVRELAYNIHTEIGESFNRAILVKPDGSREVVGEDHELEHGD  
VVKIQTS

<SEQ ID No.:0374;PRT;Methanopyrus kandleri>  
LRILALILLLSLPLTPALAEPTPSAGYSSPSEQPAQEEVKTEEQMVETSNVPPSEAVR  
35 PSTPEREKEVTTTTSAAGSSETPEITKSEKTNEKKENRVVNLREPNPVEKKNNANVT  
MLMGILAASALGAYSIKRKRREALVKVPAA

<SEQ ID No.:0375;PRT;Methanopyrus kandleri>  
MAQNVEQQVAQLQQLQQLSSIVAQKQQLLELQLREIERALKELDEIEEDTKVYKTV  
40 GGLLIEADRDEVKEELED RKETLELRVKTLEKQEKRLQQQIENLQKRLQKALQQAEG  
GGGAGAA

<SEQ ID No.:0376;PRT;Methanopyrus kandleri>  
VHALRCEAEKLSERVARVYESVLPDVKLMPARRSRVDIDRRGNNIQIEIRAEDVSA  
45 LRASASGVFRLLALSERVITTVLGDV

<SEQ ID No.:0377;PRT;Methanopyrus kandleri>  
LRPAAITTSQRPARRTRSLCRDLECALPDATYVLRGTKNLRDTVLEALES GA EVLFY  
VTEAKGNPARLHVIDLGEIPRLRLSFWLGGVKLQRELFGNRVDLSGDLVITTSKRP  
VSGHMKVAESLSEVLGVFVPRAGSLEDVLEEALADVLLVVEGHPRHLGTLTFYRR  
50 TEKVGPSLFYRDFRTKDERMKL

<SEQ ID No.:0378;PRT;Methanopyrus kandleri>

MYEEKEYEYICMRGKKVRLDINEDPIRCTHCGFRLVMKPRHPVPRRYKAR

<SEQ ID No.:0379;PRT;Methanopyrus kandleri>

5 VGR TKKVGPA GRFGPRYGM RIRRRVAEIESVQRQKHECPVCHKRAVKRVGTGIWR  
CTKCGAEFTGGAYYPETEAQRIVRRRAIRKALEEK

<SEQ ID No.:0380;PRT;Methanopyrus kandleri>

10 VDLDLLARIKRHEVLAAIRAGERIDGRDFEEFRPIEV RAGVISKANGSALVRLGNTQL  
VVG VKLEVGRPYPDSPNEGALAVNAELVPLADPSFEPGPPDENAIELSRVVD RGIR  
ESEMIDLEELCIEEGEH CWVTFVDIHVLDHDGNLFDASMIGSVSALSITEVPKAEVVD  
DEVEVMEEDTEPLAINDFPISVTIAKVGEYLLVDPCL EEEVIMDTRLTVTVTESGEVC  
AVQKGELGDFPEHLLEDAIDLATKKAEEVRRTVKAQL

<SEQ ID No.:0381;PRT;Methanopyrus kandleri>

15 MEERPERLISEDGLRLDGRKPDEM RPLKIQAGVLKRADGSAYLELGANKIVA AVYG  
PRELHPRHKQKPDRAVVRFRYNMAPFSVDERKRPGPDRRSIEISKLSKEALEPAIFT  
EYYPRTAIDIFVEVLQADAGTRCAGISAASVALADAGIEMRDLVAACAAGKVEGKV  
LDPMYYEDGYGEADVPLAMMPKEGKITLLQMDGDMTPGEFKQAVKLAKKGCKIVY  
KEQRRALKEKYGGD

<SEQ ID No.:0382;PRT;Methanopyrus kandleri>

20 VPEFELYVEDRQVVTPGELLARGQVIASEGTYTSGDEVYSKVTGLVDIDGRRIRVIPL  
AGPYRPSPGDFVVGIVEEVKFSSWLIDVRAPLPAILHVSNALEEEVDLIETDLSRYR  
PGDVITAVVREVD PVQRVELSLEDDAPTRLGRLQGGQVVEIDPVKVPRVIGRKGS  
25 MIKMLKRVLGCDIVVGANGRIYVRAREEPKKERELLAVRAIREIERRSHLRGLTDWL  
KANLKRLSRW

<SEQ ID No.:0383;PRT;Methanopyrus kandleri>

30 MGTVETLTEHLREL VGRVAPPGWEDEVREYVEATLEKYCDDVHVDTLGNVIGTIEG  
SEYEVMAAHMDEVGFIVKSIDKNGFIRFAKLGIDDRILPGSRVIIVNSEGEKVPGV  
VGTKPPHIQEPKDRRKVPKHKDLFIDIGASDREEAEELVSVGDVGVLAGEFVELVGS  
RVNGRGLDDKIGVAVLLALAERLADLDGDHPTFYLVGTVQEEVGLKGAKTSAFEVY  
PDGAVVLDTA VAGDVPGVKEAELKLGKGP AITVVDASGRGLITHPKVRKLLIDTA EEL  
35 DIPYQLEVGE GGTDDATAIHLTRGGVPTGVVGIPTRYLHSPA EVLDLEDAKHALELV  
VEVVQRFPDYVPR

<SEQ ID No.:0384;PRT;Methanopyrus kandleri>

40 MARVSLEDAVVARLEKGGERFEVLVDPEGARKFREGEDVDVEEILAVEQVFRDARK  
GERASEQAMEELFGTSDPIKVAEIVIKEGEIQLTAEQRRRMQEEVKRKIIHIIARRAVD  
PRTGAPHPPERIERAMEEAGVHIDPMKSAEEQVKDVIKQLRPVLP MKFEEVKVAIRI  
PAKYTGQAMGVVREFGDIEREEWQYDGAWVAVVRLPAGLQDEFF EKLNEITKGDF  
ESKILERESVEGP

<SEQ ID No.:0385;PRT;Methanopyrus kandleri>

45 VAVQPAQTAYDRAITVFSPDGRLFQVEYAREAVKRGTTALGIKVEEGVVLGV D KRV  
TSKLI EPESIEKVYQIDTHIGAATAGLVADARVLVERARIEAQTYRYTYGEPIDVDVLV  
KAICDLKQVYTQHGGVRPFGTALLIAGVDTKGCR LFETDPSGALTEHKATAIGEGRQ  
EALDV FEEYREDMTLQEAIELAVRALY EASREETTADNLEIAVV D KQGFRKLERKKI  
EEMFERVVGSEEDGE

50 <SEQ ID No.:0386;PRT;Methanopyrus kandleri>

VKHMVRVLSSALRPRWRYVTFKVVSERVEALDFGGMKDLVVRALLSVLGPTGTGR  
IGPWLVRSYRDLNAGILRVRRGQEEEEARAALSLYRRDPKLGRVFIEVLGTSGTIKGA  
ERYLSRIPKWDREVRVGNREFVLYENGEVDVVEDGRIVAFASFECPLPEENRG

- 5 <SEQ ID No.:0387;PRT;Methanopyrus kandleri>  
LRVSENFALRVHVDEVDPLRMALAAERLDYEIAVLCELEAERLNIDDLRWLIEEIRDI  
REHVESVLVLP GCKLEAESAGALRRRAIRRTPLVYLLAVGGGDPKINRAAVSDTRVD  
LLSHPERGNPHAGLGKYEIELAREKWTYVEIDL SRLFRREGERLAWQVSRIRDLLRL  
RRRKRFPTTVALGARDPLELIRPKQVEDLLKLMGFEDSEVKEMCVEAPREILRWNA  
10 ACKHVFTVPGVVS LG
- <SEQ ID No.:0388;PRT;Methanopyrus kandleri>  
LTLPVNSISARVIAHATEDEKKVLEALANVLGGVLEEGDVEPETFYAEGHHGNPITIF  
15 QVKIDRPKYIERVLEHWRENIPEEERRRVWSDIERRVDDKGNLYLRFDKQSAYKGE  
LRISDADDVIRVKVNLESYPASREGGIKTLERLGIFSND
- <SEQ ID No.:0389;PRT;Methanopyrus kandleri>  
VDAVSMYKYQREAWKRPKDSYVGELLKERLPKWRKGPSVQRIKRPTRIERARRLG  
YRAKPGYVVVRVRVPKGGRRKSRPKKGRRPKRMGKNKFS PGKSKQWIAEERAQR  
20 KYPNLEVLNSYWVGEDGQYKYEYVIMVDPYHPQIKSDHRINWICQKSQKGRVFRG  
KTGAGKKARGLRKRGKGAEKVRPSLRAHRRRGK
- <SEQ ID No.:0390;PRT;Methanopyrus kandleri>  
LRTEELKLKLKELVESIEDEGLRELVMKVLEEGFAHEEVPDPEPVEEAPASRRQHHS  
25 YPGGLEHTVATTKLALAMAEVFEEIYGLEVDRLVIAAAILHDLGKATSYERREERY  
KISDFGRRLDHLTLIAAELYARGAPVELIHAVAAHHGRGSPVPPNTPEALIVHLADRS  
DAEFATEVIKAARNVVRARLRELDVEPTDELVEEVLRRVGPSEIFLTRVREGRDAVR  
QLVAETLEEIEEGSSP
- 30 <SEQ ID No.:0391;PRT;Methanopyrus kandleri>  
LPDRVRIFD TT LRDGEQTPGVSLTVEEKVEIARKLDEF GVD TIEAGFPVASEGEFEAV  
RAIAGEELDAEICGLARCVKGDIDAAIDADVDCVHVFIATSDIHLRYKLEMSREEALE  
RAIEGVEYASDHGVTVEFSAEDATRTDRDYLLLEVYKATVEAGADRVNVPD TVGVM T  
PPEMYRLTAEVVDADV PVS VHC HND FGM AVANSLAAVEAGAEQVHVTVNGIGER  
35 AGNASLEQVVMALKALYDIELDVRTEMLVELSRLVERLTGVVPPNTPIVGENAFAH  
ESGIHSHGVIIKAETYEPIRPEDVG HRRRIVLGKHAGRHAIKKKLEEMGIEVTEEQLD  
EIVRRVKELGDKGKRVTEDDLEAIARDVVGEPSEAAVKLEEIAVMTGNKFTPTAS  
VRVYLDGEEHEAAS TGVGSVDAAIRALREAIEELGMDVELKEYRLEAITGGTDALAE  
VTVRLEDEDGNVTTARGAAEDIVMASVKAFVRGVNRLARRRRD  
40
- <SEQ ID No.:0392;PRT;Methanopyrus kandleri>  
LKIRPEDLTDFVSEALHAVGVPRKDARTAAEVIVEGDLRGFHS HGVLRLPGYIEGIKR  
GAIRPEMRIEEISRKSSVLYDADHSLGHVVG YRATLEAVELARKHGLGMVAVRNA  
SHYGIAGYYTTLVAERGFIGFTTCGTEPAVAPYGGSQPV LGTNPVSIAFPRRDGPPI  
45 VVDMATSVVARGKILQALRENREIPQDWAVGPDGEPTTDPEEALEGALLPFGGHKG  
YALCLALEVLAGPVVGAAGKDVQGTDTPTVPCNKGDVFVALDLSTLVDEHEYER  
LERLISQVKSAGDDVLLPGEPEFRRRERALREGIELPEGSVRVREVAEELGLEDP T  
R
- 50 <SEQ ID No.:0393;PRT;Methanopyrus kandleri>  
MGMKRIEALRVVADVAERYDAVVTVHLGFPARELYRVNDRRLNFYMLGAMGQSCS  
VGLGLALCTDREVLAIEGDGGLMMNMGVLP TIAQERPRNYTLVLIDNSTYATTGDQP

TPSDRIDWEKVAEAHGLTYFEASEPESAEEVALEDALATEGPRMVRLEVEPGNADVPLIDLDPEEIKVRFVRALREG

<SEQ ID No.:0394;PRT;Methanopyrus kandleri>

5 VKAFEKSVKIPKVDGATVMLDKGLTPEFVESFLKVAGEYVTAVKLGWGTARLIDKEI  
VARKVEMYVDAGLDVFPGGTLAEIAIAQGNFEGYLNELDELGFNAIEISDGMIPMSIE  
KKCELIERACEQGFTVYAEEGKKRDEEYSVLSPSDIVGRMNKCV EAGA EYVIVEAR  
ESGKHGPMGAEKRRERVRLSEIVKGVGIQRMFEAPEKEQQFELIVKFGPEVNIAN  
VPPEEVIPLATLRAGLRAETMGRVALDGE

<SEQ ID No.:0395;PRT;Methanopyrus kandleri>

10 LNVDDAIVEALEEAGITFACWLPCSLLDGIIRLEEHP EIRTVRVSREEEGVGICAGAA  
LAGEKPALIMQNSGLGNSVNALCSLTLYRLPLMLMSHRGYLFEDIPAQVGMGKA  
APKILENLNLHAFTIERPEELDVIPGAWKLAETAGEPVGVFLSPRLWRQTGR

<SEQ ID No.:0396;PRT;Methanopyrus kandleri>

15 MGDRPRRLGSRLLYAGCVLLTETVDAIMDKLKSNCDIVRVQVEDVSFHLRVHTNDA  
GVSRELRLRNIREPKASKYLVGKFLNDEEIAFDVGANIGYYAILTALASERSRVYAI EP  
VRENLELLRENIALNNLED RVKAF EYAVSDKCGRIRMILENRSNWHRIVNAEDGDYI  
20 EVESITLDELSEKLGERPTYVRMDVEGAEEVIRGMVELLESDDPPKLFIEHHIHLG  
LDATLDLIETLLDYGLEIAAAF GYPHASLHDREGGYRPLVGEVVRWRGLDVELYEPS  
FEELHDVIVEKSWDCFHVFYRPV

<SEQ ID No.:0397;PRT;Methanopyrus kandleri>

25 MAAKGELVGSKVLVRNDRDANRLYSSMYGKPSRRGLQLWP EEALFLCEIGRLEVR  
SGNVRISPEELMDRFVEEDPRFPVRYAVYADLRRRGWKPKPKGRKFGTEFRAFRGE  
DERIAVKVLQEELDEFTAQDILEWLKLVEGTEFELVVAIVDNDYDLNYYVFSELVL

<SEQ ID No.:0398;PRT;Methanopyrus kandleri>

30 VTVGRRLDAFLRDVGLAESRREAKRLVESGRVRVNGKLV RKPWWLVSPGDEIEVD  
GVTVRVEDNGGERRVSRIEGARSE

<SEQ ID No.:0399;PRT;Methanopyrus kandleri>

35 MISRVVLTTYVYPT EDEEKVRKAVGNLFDLEMFEEREEEMGDLRRLEFVCEGPQAR  
LSLGRIYELLREQEILDAARRVLREGVTAEGSILFHLNKQAAFA GSVSFAEGGESPLG  
PIVVEVFPERPEDVEKVIDWLAPETIDGKPIYEVKKPRLREEELE

<SEQ ID No.:0400;PRT;Methanopyrus kandleri>

40 MLICVVGMPGAGKG EFKVAREEGIPVVVMGDAVRREAERRGMDVGEMAKRLRE  
ERGMDAVARLVEEDVERELRRAGVVIDGIRNPEELEYFRDRFGERSVIVVAIHASP  
QTRFERLRIRGREDDPD TKREFEERDERELGFGIGDVISRADVMIVNERVSLPEFRE  
KCRMVIRAILRGDPDDLPGGFDHLRVPD

<SEQ ID No.:0401;PRT;Methanopyrus kandleri>

45 LGEPAAVPRAAELRLVKCPPPRHFP EMVKLSRALFRLLVEEHGTDGALEKLADPRW  
FQSLACLLGYERN TSGSTTVTAALREALDPEEHGIAVAGGKGRLAETPKRVRELA  
DRMNLDPRLVTASRLTARSDSVCLQDGHDL YHHVIVFDENGRWVVIQQGMDVDR  
KTARRYHWLDSEVSEFVEGHPVVADETRKVL SLQGDRADKCREAVLDLVGDGPDR  
VLREWRAVRNSISGPLDEYLGREGGVEVPD GWVPRRLDRDALRRLYEVNPTDFKE  
50 FLTVRGVGPSLVRALALIAEVVYGE GPD RRDP AEYTA AFGCKSGDPYPVHRELMRL  
AAELLERIRSPRLRRFLGRVTES



<SEQ ID No.:0402;PRT;Methanopyrus kandleri>

MELLTLAPDVRPEETERMARKIQDKLKLPAEPDPLKPVRRRLRIEGVEDPDGIVSKLR  
EEFPEVSRVWIVKRRGRSHDLDRIAAQAQAKLARGEILPHHTFAVDARRLDKDLPYTS  
RD LAIKVGEAVRRVTGASVDLDSPDRYVDVHVS RHGHLGITPATLREPHRSWLPS  
5 GAFKHVHVCCERPETEYEIADLRITAALGLGSLILVEPNRDAVRGAEKEKVGASSLIDL  
RIEEDLKEALAEFDVVVGLHPTAPNAESELLRAVEGANQICLLTGSETKGLSREAKE  
ADVLVHLGPTTAEP MRTANAVAYAVGVLAARTVSLGSATAPTLHR

<SEQ ID No.:0403;PRT;Methanopyrus kandleri>

10 VSGVLVLERIFEEAEGEGRGALIGYLT CGHPGLEETVSLARALRDGGVDILELGV PFS  
EPIADGPTIQKAVDEALRAGTTPWDCLEVAEEVSEFVPVLLCYNTLHANGFERYL  
SAAAEAGVSGIIVADMPVEESDEVHVSARDLEIDVIYLVAPSTTDERLKKIGERASGF  
VYVISRYGVTGARRDLSED TLELVRWVRDHVDVPVAVGFGISERWHVEEVIAAGAD  
15 GAIVGSAFIKEIHRSEDIAEAEERVRELAKELVEGARDGYRRRSSE

<SEQ ID No.:0404;PRT;Methanopyrus kandleri>

15 LTLIAQIAASFGALLGAWLFTNTVEWISYRFKLPSGFTGSFIAAVATALPETLVPIVAII  
AGYREGVAVGAILGAPLMLSTVAMGIGGLSVLAAYLMGRRRRPVIKTSHFSLDARHF  
LVAYSLVLAVSLTDFKPAHF AVA AVLFLLYLVYVRLLRTGDVVEQPSIELEMAHPVL  
20 AGLLA AVFLVGSVALLVAGAHGFAD AVERLAERLGADPFTVSCLLAPIATELPEKLNS  
VIWYLKGRDDALGNVTGAMVFQATFPVAVGLLFTSWRLGSRELATVTVPLAAMVL  
LYLYSRRNGLDWKVM SAVAVLYPVPFVLT

<SEQ ID No.:0405;PRT;Methanopyrus kandleri>

25 VSGTIKLSRCGLRAPTCEPVRRSYFERLRRYRDYQVRELYESGVRIKVLARVFDLSE  
GEIKEILLSPPRCARCGKPLRTNVPLCSECERVLEGDDRSRTDGR

<SEQ ID No.:0406;PRT;Methanopyrus kandleri>

30 MIGAVLMGGKGRRLLGGDKPWLT VNGRPIVEWATEMLRRIGCEEVYAVSPRRDGR  
WDGPWLRDSKSGSGPMAGVRAV FREFPNEIVCVTSCDVVFDPRIFREVAEPPCHTR  
GTLFPFLVRAEDAPEHRTVREFLKNIGSTELEV PATDLDELEDLPRYRALLSRITG

<SEQ ID No.:0407;PRT;Methanopyrus kandleri>

35 VVSDVIVVGIDIVRSEPPEYAVAILEDGEEVLKKRLSKRELF DLILSLKPDVVA VDDVY  
ELLDGASEFLELVKSHPELKL VQVTGKPGDQQRSLQRLAREHGLPTPDPRNPEEEAL  
TCARLAELGVGVFAFVLEDETRVRIGRLRRPGGGYSQSR YARNLHAAVKRATREL  
QRLLEAEGMEYDLRVRKAEGGYASAEFTVYERYDRVKPVVNKVDAREIKIDVEPVL  
RDRITFRDTS HRRELLTIGVDPGTTTALAVLNADGEV VHLESSRELSFS ELTERIESL  
40 GRPAVVATDVTPVPQAVRRLARSLGARLYVPDRRLSVDEKREL VKGHLARRDQNI  
PRDTHQRDALAAAVKAYHAIVKPALRKVERKASEEIKRRDVLRAASYVIKGLPVVDA  
LRIVEEERQVERERREEREKIHRYRERIASLKKELRAYEKKVKKYEHEIEHLERLVER  
LKRENEELKEKLD RMRDRMEELVEEKIGRKLEAKEREIERLRRELIREKSRRERLER  
ELRRAERLNAILRSGKGIPVVEVEKASHEALAGLETPPVFVLYVEDPSGMSESNVRE  
45 LSDLSPEAVIVPEDASIP EHALEEFRRDLPLLREGEDVTVKRAGTLALVESDELRA  
VRRTRKRWEEREREREKERILRCIEEYQRRRRRGKFIR

<SEQ ID No.:0408;PRT;Methanopyrus kandleri>

50 VNPAPSELRF GAY AIDCVITAVMSLLICLALARPVTPVRFLSTWSLISWIYWTMFEGT  
YGESPGKR VFGLKVNEEGEAVSLPEAAIRNVSKALPVVCYVDGALILLTESRQRAF  
DLLAGTFVVTSG

<SEQ ID No.:0409;PRT;Methanopyrus kandleri>

LIAVLVDDGFEELELGAVVSVLSRGGLDWDLVGVEERAEGMGGMEVGV DSTVWDV  
EGDDYEGVWVLGGSAPTTLIGYRHCLDLVRSVESDGGMVVGLSSGALVLA EAGVLR  
GRKATTYPGF EAELKVNGAEPV PKGVVRDGNVVT SRGPAFAIDACLEV VREL CGD  
HMANSVARQLILK

5

<SEQ ID No.:0410;PRT;Methanopyrus kandleri>  
LLVVS LGCPKIPPKISSAIYACYRYDDRALVLSTEAGCKLLEYADPEKEYVDETRTYE  
KYLEDPDAAGILLAFVTNDTELQIAVTLKEVSEPDDARAVCTEEFEDRLED CGFLTAP  
VTGRRWKHDPKRWVKAVEDVLGASR

10

<SEQ ID No.:0411;PRT;Methanopyrus kandleri>  
MTFCLEEREYEILMARRPFDDCARYIESKFGNIVKLQPGEEILPGLRAIGYGKIPVAY  
GDEWIVLPITKPCHGSFVVKIEVSAEELEWFLKKHVSGR

15

<SEQ ID No.:0412;PRT;Methanopyrus kandleri>  
MGKRIRPQRLGRGGPTYRAPSHRYRGRIEHRPYDEQEKKGKVVGKVV ELLHDPAR  
NAPVARVRFEDGEERLILVPEGTKVGDIECGVSAEIKPGNTLPLAEIPEGVPIFNIEG  
QPGDGGKFARAPGCYATIIAHDVGRTYVQLPSGKVRTFDPRCRATIGVMSGGGR  
EKPFVKAGKKYYHMRSKGGKWPKVRGVAMNAVDHPFGGGNHQSPGKPTTIARGD  
PPGRKVGHIAARKTGRGGRR

20

<SEQ ID No.:0413;PRT;Methanopyrus kandleri>  
VAKRYGPKIEDPHDVLLYPVATEKAMRLMEAENKLT FIVRRDANKPLIKKAVEELFDV  
EVEKVNTLITPTGEKKAYVKLKPEYRAEDVAVDLGIL

25

<SEQ ID No.:0414;PRT;Methanopyrus kandleri>  
VEAPVFNLEGE EVDTVELPSFFEEPVRKDLIRRAVLAAQANRRQPYGTDPRAGFRT  
SAESWGAGHGVAMVPRVKGRRHPAAGRAARVAQAVGGQKAHAPTPEKDW TQRV  
NRKERRAALRSALAA TAKPEFVKERGHVIDDVPHLPVVVVDELKSLNKAREVREFFK  
SVGLWADVERAKSNRRIRAGKGKRRGRRYVKPKSVLIVVDEDEGIKLGARNHPGV  
DVVEAMHLGVEHLAPGAHPGRLTVFTPGALEVLEERLGE

30

<SEQ ID No.:0415;PRT;Methanopyrus kandleri>  
MGRGGRRNPGRPRRGSLAFSPRKRASRPVPRIRSWPDEERV RVQGFAGYKAGM  
THAIMIDDWPNSPTEGEEISVPVTILDAPPMYVA AIRAYAPTPDGYRCVTEAWAEIPE  
ELEMDRVFTVPKDGEAGDLKDIEELVDEGIVEEIRVIVATQPKKAGVPKKKPDVMEY  
RIGGKDVRRERFEYAVEILSEEIRAKDVDFDEGEIVDVSAITKGKGFQGVV KRWGV TIQ  
DRKTQRKQKGRHIGSIGPITPSRVRWTVPMAGQVGYHQRTEHNKRILKIGEDGEEV  
TPRGGFVN YGVVRGDYIMIHGTVP GPKKRLIRVRPAVRPPKNAPEGAPEILYISRTS  
QQGVRPKASEDEIVEQLGGPASA

40

<SEQ ID No.:0416;PRT;Methanopyrus kandleri>  
VDVRS AERLLEDLKEFAERVNKAFSRINPQIMERRTPRGWLRE MVREYFENLGAEV  
LREACEIAKEDIRSYRELD ELLQEIERSTDREEDVLYVRRALLRYMFCRTYTLQRLLV  
RLYWLSAGTADVAELVGMLRRMDLFAEEAQLIYPVTPDVEDLREAVKDAIQVIGEE  
VGAGTEEEEDDRLEPEPKLEV CVVRGKLPAFVDPDTGAEVPPSKEGDLLMVGETAA  
RILSERGRRWGGPF AEHVRRWRG

45

<SEQ ID No.:0417;PRT;Methanopyrus kandleri>  
LAKIPKKIRTYCPYCRKHTIHEVERAKKNPARKMSWGQRQFERVLKGYGGFPRPKP  
SGEKPTKKVDLRYRCTECGKAHTRKGWRAGTLEITEE

50

<SEQ ID No.:0418;PRT;Methanopyrus kandleri>  
 LDEKRLKRFTESDLVPQPRSRFLRVECVDCGNEQIIFGNASTEVKCHICGRTLAKP  
 TGGKAKILTKIKEVLE

5 <SEQ ID No.:0419;PRT;Methanopyrus kandleri>  
 MPRKLRDLPEEGEIVMATVERVEDHGAFVTLDEYPGVDGYIHISEVASGWVKNIRD  
 YVKEGQKVAKVIRVNPKRKYANLSLRKVTDHQRKEKLKEWKREQRAEKLLEMAA  
 EELGKDLDEAYEEAGYKLIEEYGSLYDALERAAAEEGPEPLLKAGVPEEWAELKLAEL  
 AENIEPGRVKIEAYVDLTCPAPNGVEIIREALEKIEEFQQGDVKMEVQYVGAPRYRIT  
 10 VDAPDYRTAEKMVRKAAQAIDHVEEHGGEGEFHREIEEG

<SEQ ID No.:0420;PRT;Methanopyrus kandleri>  
 VPKRLRRCKEAGEYTLQRDKCPHCGGDLEVPHPHRFSPEDPYGKYRRKLKKRWV  
 AEKFGPPSGEGD

15 <SEQ ID No.:0421;PRT;Methanopyrus kandleri>  
 LDLLKLARGNTVIKFDPEPEVEEPVLVEGLPGIGHVGKLAAEAMIEDLGAEKFAELYS  
 PYFPPHVSVNEDGIVEVMRNEFYVYESEGDEPDIIFLIGEAAQAGELGQHEVTIRILQ  
 TVKEFGTEMIFTLGGLGTGTVPTEPKVVGAATHKELIDLLKEHGIEVRSGDKGGNIV  
 20 GASGLLLGFGKMMGMKGVCMLMGVTPGHVIDPRAAMAVVEKLSTILGVEVEADSLKK  
 RAERFEREFVAQLEEMPSSALEEAQQEAEEGKPEEDLRYIG

<SEQ ID No.:0422;PRT;Methanopyrus kandleri>  
 LVLRLATLPLHALIFGLTLFTAFIRPPLAPIYEKRRERYDPWNSIVLAALMIYGLAPLVGL  
 25 ENSCLAFLVAKGVDGAGGLAQFIPGSINPVVSLKGFRIREVEEGISPIGTFFFEFLAAL  
 GLWLITGSTQGALVMGIAVTAADILSNVTGVEDHHKGDDLLMMLSAAWVIQTFGV  
 SGLMRLGLMPGW

<SEQ ID No.:0423;PRT;Methanopyrus kandleri>  
 30 VDLRYLTSAISVSLFVYSGIDTEPLQYVTAQWVESVLHLMGLTVPKAGYTFQVGTVS  
 AMIVKGCVVWPAISLFLVGLIVATPGPSVLRKIAALAASVALLTAGNVRLASMFYMMME  
 VWGVGFRLAHDVIGQLVGLAIVILAAWVAFYIVPETEDKLREIIPWPGE

<SEQ ID No.:0424;PRT;Methanopyrus kandleri>  
 35 VGEQYDSDLHLHSQYSGGTSPRMVIREIARGAAKKGLDLVGTGDILHPKWRRHRV  
 RELVEDEYGLLKEPKTGVLFVPTVEVEDERRVHHLIILPSLDHAEELHGELSRYSDDI  
 DAEGRPHLRMTGAELADLLKDHDCLFGPAHAFAVPWTSVFKEYDSLRECYGSAMDR  
 VDFVELGLSADSDYADRISELHEYFTLTCSDAHSPYPHRLGREFVRFELEEPSYDVL  
 KAAIRRKPGGRVVLNVGLIPELGKYNRTACARCKRQFELEEAERLNWRCPECGGTI  
 40 KKGVRDRVLELADLEKPKHPNHRPPYLRIIPLAEIIAKALGLSTITAKKVRVWNSLVR  
 RFGSEIDVLIETPIEEIAEVDERVAELLKSFREGTVNIRPGGGGEYGKIITEEESEREE  
 PRSRKPVQRTLDELIGRG

<SEQ ID No.:0425;PRT;Methanopyrus kandleri>  
 45 VTRLFFRRRSVESFAERIEVKVGVEEELFLIDRDGSLTRAADDVIVKAAELLESNSNL  
 LEDCWRTVLGLDPEPNPAQIEYLTQPLPPDEVIEACEIGRELKKAEEELGLQVMLES  
 MHPFESDPLPINGTHINVMVKLKDQPYMTPKQILVVYNWLWHNLPPIIAATANTPYCC  
 GGKNLAASCRLKSRVLKPNYYAAIKRLEKRPYLTQTQYYGRLRYRLRLRKDTEFEE  
 RVVAHPDGRRLVDITPRGPASNVTDENDSPTRNRVEVRVIDNQKSMKYLHDVVM  
 50 LIVGLSLEALYIYEVEGKLPPNDPNHFDNRREAIEKGINATFVINGREIDAEDALLKIIS  
 RVDKFLEHLGLRFVSPLKNGKVELQERPKNLVEYVHKDVIKYIGNYAEVILGSNKTVE

IKGKRYTIPKGTKVIGKLVPMAASYKYRVDNKGFKDIIKGVVTLGIKRNNGVEIPLDESD  
RIVNVMSELEYLMRSMRGLL

<SEQ ID No.:0426;PRT;Methanopyrus kandleri>

MIIDVHNHLGEDIDSTVQTPQMLLARMEAAGVDIAVVPFNDVDPGVCFSKANDRIA  
KACEEYDEFVGFRCRVDPNYEERAVEEVERCIEELGLKGVKLHPRSQSFPDDPEAV  
KVVEKAADLGVPVILHTARGEPPSDPVRVGKLAEEVPDVQLIMAHMGKELGYDAAIE  
VAENYENVYLEVSLVKDPKVIKTAERVGDDRIIFGSDSPYGPSVQLEIVKEADVNH  
DKILEENANILGLR

<SEQ ID No.:0427;PRT;Methanopyrus kandleri>

VLITAPHAQGPADVFTGEIAWKVAQATGAYALVATVSRRAKLEDGNPADYNREW  
ARNTPFRRRIDELIKRYGVRFIIVHGMESDPVRPDVLDLGTGGRSAGKGLVSKIVK  
RLEEAGFDVGFQEFQGGDILEYHCDGERVQGVQLELSEELRELGEYRAIQAVLVV  
VNTVLEEV

<SEQ ID No.:0428;PRT;Methanopyrus kandleri>

MVAVVLVGHGSRLPYSRQVVEKIAEYVEEMGDFETVEVGFMECEPTVQEAVKKA  
AESGVDKIVVVPVFLAHGVHTKRDIPKMLGLEPEWDDDEDDHDDHHHHHRDYTPV  
DVDAEIVYAEPLGADPRIAEIVIDRIKEALGEE

<SEQ ID No.:0429;PRT;Methanopyrus kandleri>

LIATLTGRTIEDMVELAIEAVEQGADALEVRLDYLENLDMSTALRAVRECTRYERVV  
ATLRREEEGGLYKGDDEDRRLEILERSSEADYVDLELDVAEEEEIISPSCETIVSYHNF  
ENTPPKEELIGIRDRCAELGDVAKVVTMARGHEDALRILEVVRTAEAPTIGFAMGEE  
AKYTRVVSVLIGGFATYAAVRKKAAPGQLTVEETRKLLELLG

<SEQ ID No.:0430;PRT;Methanopyrus kandleri>

VEREITPIVLREGYEFINDCSESDVIVVGAGPAGLTCAVELAKSDVDVTIVERKLYVG  
GGMTGGGMLFPAGVIMEETAEVLEEVGVELRPAAEAGLLAFNPVEAAIKLANAALEA  
GARILVGIEVEDVIERRGRVCGVVVNWTAVKAAANMHVDPLALEAEYTVDATGHEAA  
VCKLAGIEVKGEGPMWAERGEELVVKHTQEVKPGFLVAGMAASAVKGAYRMGPIF  
GGMLESKGKAAEEILERLTE

<SEQ ID No.:0431;PRT;Methanopyrus kandleri>

MTIAEFVAVGVLTALIIAIALIVRSREVPEGEGLSMLRDKISLTTRSDVITKKVDELIEC  
RVEELIDSWGLATTEDVEKVEKRVDAIDRKLNELEQRFNEFRNDIRRKIERLESRLR  
ELSSE

<SEQ ID No.:0432;PRT;Methanopyrus kandleri>

MVSVLIGSTAAVIIVLIALKTYSKKLRIRELELKVEREKVELVRADLERRKLLDLLFYL  
PEDTRLMKRVGEIRSLTRLAEKYMDEVETRLTVVELETELKRLEKILKDLERVEGDVR  
GGENE

<SEQ ID No.:0433;PRT;Methanopyrus kandleri>

VRILITNDDGIASPLRAAVRACRSVGEVTVVAPATQQSGVGRSISLLEPVRVEEIEV  
EGVDALAISGTPADAVLIGAFSIMDEPPDLVSGINLGENVSADVTTSGTVGAALAEAY  
GNGIPAIAISQEVDRARVDNNAKNVDFTLAIRVLKALLEAIRGANWEGVLNVNVP  
DPDRWNGEIKVVPLAFTMYRPRIEKRYDPRGRYYWIDGEIIQDPPEGTDLYELQR  
GSIVITPLTTDVTGDLDAEENVIKELRRALRG

<SEQ ID No.:0434;PRT;Methanopyrus kandleri>

- 5 MQFWKVHGARND FVLVDETEEEVVPESDKPDFARWACDRRSGVGADGVVFIRSD  
PPSVEMRIFNRDGSEAEFCGNAARCVVKYVTEVRGENVKILRTLSGAHRVEVQGG  
WIAVEVPEAEIKKVVELGYEVDAGVPHFVRLTERDPIHDFGGLTDEAKTIFSEYEPKG  
GVNVTYAAPSVDELVRVTFERGVGWTPACGSGVVAASLVYSEIFGPFEEVSVRTA  
GGCLRVSLSDGPLLIGRAEIVYKGELRGDWRENTDHQRRRHSLSRSPSGRPRLQE  
CR
- 10 <SEQ ID No.:0435;PRT;Methanopyrus kandleri>  
VRPLSELDP EELIRYISESPKRTIAKFYVKTDDPEGLAERLEERLEDAKVFTGVDHVIV  
IGEHD DVVEVLESEDSVEYYHKELDHRNRAVPLADYSEFEDVRIEPGAIREKVKL GK  
GVVMMGAVINIGAKIGDGT MVD MNAVVGSR AEVGKNVHIGAGAVIAGVLEPPSAK  
PVVIEDDVIGANAVILEGVRVGKGAVVAAGAVVTEDVPPSKVVAGV PARVVKDVD  
KKTEAKTQIVDALRCL
- 15 <SEQ ID No.:0436;PRT;Methanopyrus kandleri>  
LRRVLINNKDSFVYNLYHLFASYDL DLKVVS NKVPLSR LERLRPDGLV VSPGPGHP  
ERDAGVSVPAIRRFAGEIPILGVCLGHQCIGVAYGAQIRRAKRIVHGKTSPIEHDGSG  
ILSGLESPFQGMRYHSLVIEESSLPEELLPCAWSGDDGELMAVRHADYDVYGVQFH  
PESFMTEGGDRIARNFLELLG
- 20 <SEQ ID No.:0437;PRT;Methanopyrus kandleri>  
VRLTVRELDIDRSPDEVYAALRTLSSHTFLFESAEIGASGRYSFVGFSPALRIECVDG  
RVRVDVGDPEYADLVVEGRKETDEDHFQLMRRVFSRIPKVEGSGFVGGLVGYISY  
DVVEDWLDVKSTTVADPEWPSFELCLYDSVVRFDDHYEDRVELISVHPDDYEVEWT  
25 AEAIEECVREVSGQTAPKVHRTGELKRDLEKEEFEGIVERAKEYIISGDIFQVVL SRR  
VEVRAVADPLEVYRRLRDINPSPYMYCLEFGERRIIGSSPETLVRLEGDRIITKPIAGT  
RPRGSTPEEDEELAREMLEDEKELAEHAMLVDLARNDVGKVS RPGTVEVTRLMEIE  
KYSHVQHIVSEVVGERKEGVTPWDVLRATFPAGTVSGAPKVRAMEIIDELEVYKRG  
PYAGGVGYVSWTGDMDFAISIRTIFSTGRRWFTQAGAGIVYDSVPENEFETENK  
30 MKAMVGAILEETSSDK
- <SEQ ID No.:0438;PRT;Methanopyrus kandleri>  
LPFPMERFMLSITLWNTMTILITTFGGGLIALTLDRLVTRYAPDVLRRSMNNPPYAPILV  
KLARKLGFDVRRYKEADVILTLKGLPLIPAINGF AAGAFGMWVLQNF GPVFL LGAAL  
35 LPHGVIEFPTLIAGAMGVHLADYLIYRVLHERWPHGNLEVPSWVIRNTAACIAGLT  
VAAYLEVHITPIVAGCVMKCA
- <SEQ ID No.:0439;PRT;Methanopyrus kandleri>  
MPFDRDKLEELRSLAQ RDFDRAWKEGAKLVREPGLRDRYPRLKVETGEPHPLFETI  
40 QQLREAYLRAGFREVVNPV IIP EEEVYKQFGPEAAAVLDRCFYLAGLPRPDVGLGA  
DKVEKLAEVLGREPSEDEVERLRETLHAYKKGEIDGDELTHEIAEALDTDDGTAVRIL  
DEVFPELKR LKPEPLEPPLTLRSHMTAGWFITLSEILKREDPPLKLF SIDRCFRREQR  
EDESHLMTYHSASCVVSDDVTVDTGKAVAEAILRQFGFEDFEFVPDEKMSKYYVP  
GTQTEVYAYHPDLED SIEDEELGPGWVEIATFGLYSPVALAEYGIDYPMNLGIGVE  
45 RLCMV LHGIDDVRS LAYVEYEPWEPDLELARMIDYERKPATSFGERLVREVVRGL  
HEHADEEGPVEVELFRGEFGDREV VHAVEEEKGEPLAGPAAFNRVYVLDGNLYA  
VPPEGDFGREIREEGVYSGVSFE EGLAARLAYEVEELLATGGGETTVSVRKVSRPS  
QVNLSLPRKLLRYVT KKGGEIEIKGPVFVTLRAEVR
- 50 <SEQ ID No.:0440;PRT;Methanopyrus kandleri>  
VRPLPLIVACAVALASPALAWERTEVSDTYVLN YEGDAPNHLMLD VDIADENG NVF  
VGWLLDGLESKSEPRVWEGLMDRVT VILNAIYDDGKLRLEM RKTFTVHFDYDGND

GVHVVYVKGDDAPIIRTEDGRTVLWERCQRRRIRSSDNGRRRCERSEMEGRTWR  
R

<SEQ ID No.:0441;PRT;Methanopyrus kandleri>

5 VHWIAEGWARIRVKVAASNSGKVLRLDISWHYDKEERREERQERGVPVGAVASL  
TGWWLAWMLRSSRSRY

<SEQ ID No.:0442;PRT;Methanopyrus kandleri>

10 VDAAILTVSVLSLCLVDLNKQADRLETHLPFRLSSPYPTPFYVVLARPESIEVHPPMD  
PEGELRIEVLPSGSKVLFDSREYGARTVVEFRGPYLMVTRLPVVGLPRDLPRAAVFF  
SDGRRNYALISYRDVATGRAYVALCEIALNLHELVRVPVPISLDLGERLSEFTLYDNG  
TFSAKFEAGGGELVVRGSLRPPGLSVEWDGEGELIGEKRPIVPGTSWALLNKCPVI  
VFGQGTNDLLWPDREYLVWRTLSYRSELEDVVEEIVKRSKRSIDLGPALLCAYSTL  
15 AGLTVDTLISQVRPRLWSGPWAUWGAVVETVVGIPVLEWGVLLPIVTRTGELIGTV  
APTVDRLSGVVTGIYWLTVIEWYEAUWLRVIMRTCGLSWWETGMLWUWALDNLNSL  
KERSLNPHDLMRRLTFHVAASLSPVLEVALYAENAEDTGGDVITYYSSILAAMVRWP  
EQSLPLQRLL

<SEQ ID No.:0443;PRT;Methanopyrus kandleri>

20 VEDLHHRGTSVSEIENLRETIENIREELDALARDEAQVILRDLHKLSSSEAVYEVHR  
GNLEEARDKLDEAAELVSELHDLGDFPELLRTGFAENHLQEYAEAEILYSIVKDRR  
APSPEEINVSPRAYLLGLLDAGELRRIVDALREGDLDRAEFLNVMEIYSLTMTF  
DYPRAWPNLKRKQDVARSLERTRSEVTIAGKTEELKKTLE

<SEQ ID No.:0444;PRT;Methanopyrus kandleri>

25 LSSLSRQELTARVFVEWEETRRSLRECVKKVLLNEGVRDHRVWGTIHAYCFELMKR  
LRTVDAFLEATIRNAKLFDLPWVRNALRVGTFEMKFNDVKPAIATNEAVKIVVECV  
GEGPARFVNAVLYDVERLELSDVLNRAKDTVERLAIEYSHPEWVFKHLMDLLGENE  
LTKLMDANNREPERYLRVHAHMVDPDKAILALEDGVAVEEDPDLPFMLRVVDHVD  
30 PPVRTEPYRRGWVAYQDKASAAAAYALRPEPGDRVLDACAAPGGKSAYLYALTEG  
EIELTCVDVNPRRLREMRRNFRRWGIEARLRADSSRLYRETDETFDLALVDPPCS  
SSGAYVRAPEAKWTVKWRHVWKRYARGQLSILRGVAPLVERTLVYSTCSVTVVEDE  
SVVRRFLREFDEFEEVPEFGFGSPGFDWMNERYPWADRVRFRFWPHRHRTEGFF  
VARLVRS

<SEQ ID No.:0445;PRT;Methanopyrus kandleri>

35 LYLAEVAGIEELSAVAVLGIGGGGDVVGACHTYRWIREGIEPERLVLGGLTWERAUV  
DPEPGPRSRDEIVGDVEWIIHERIGILRGRARPRRGQEFASRVRRVLRRMGHRDV  
EIVLVDVSGGVKGTVDGLKALIEHFELDVVFGIDVGGDALARGDEPGVESPLADSIM  
40 TCSLSKLEETVLGVFGWGSDELTREELRRRFSEIAAEGGYLGAIGLTGRDVKFLKK  
LAEVVETEASLIPLRAAVEGELGPLEIRGGYRTVELGPASVCTFYFDPEVVARGSILC  
ELVDGTESVEEAHERIRKELGIKTELDWERERAER

<SEQ ID No.:0446;PRT;Methanopyrus kandleri>

45 VLLNEVKVRKIVELALTEDVGRADLTSSIVEGERAEAEIVAKEEGVVSGLTPARLTFE  
LLDCEVDVLVEDGERIQPGDIVLKAYGEATALLAERVALNFLMRLSGIATATRKVVE  
RVREVNPVIVAATRKVHPITGFLEKKAVSDGGGDLHRFGLDDAVLIKDNHLALVGS  
VRDAVRRARERVGFTKVIGVEVESIEDAVEAAKAGADHVLLDNMKPAEIRRAVNEV  
50 RKVREDVILEASGGITPENAPEYAETGVDVISLGLWTHSAPALDLSMRVRRMT

<SEQ ID No.:0447;PRT;Methanopyrus kandleri>



5 MSTDYLPIGSHEVIRALHDLEPDVVAYLPGFPLNEVVRALEESDHPFEVVPVASEFD  
AVGIVIGLAQADGYGVAVLKDKGAYVAAQLLAEEGDWPGLLIIGLDADGRGSYTCVS  
ELPDVLRDLKLRVEIPETQDDIYETILDAAESSRDEHRLACVVLTEDELLSSHPPGKP  
EVEPTGEADWDELLRAIDFYDTVAVVVGKGVLDISRDLPFTSSLNDDRDALDRLV  
EILESGLDVRLYCTKHASKFLPGIPPTGVNTGNVVEEELLVLVGASYDTFAVDFRSD  
FVSVNPDPA DAYAHRVADARFVMTLSDFVRELEYRSRK

10 <SEQ ID No.:0448;PRT;Methanopyrus kandleri>  
LRPEEALLALRKVLKEEDRVIVDLGDHTIAAAKVGLDPDGGTGALGGSMSVALGHCL  
GTDGGRVYCVGDGGFFMHLHTLATVAQNRDRFENLTVVVTDAAWGMTGGQEN  
PAVHTSPADIARSMGFDPAEIAESVEEAEVLKRCRKEGPSLVEMRCRPITFL

15 <SEQ ID No.:0449;PRT;Methanopyrus kandleri>  
LEERIRCEICGRVINGRPKVVKVEGSELVCEECAKFGREVVKPRPRRETGRVQRE  
RRPRRRPTGARRRPRGDFPFSEGLEVPDYDERVREARERRGWSQEDLAKKIGE  
KVS VIRRIESGKMEPDVELARKLERVLEIELLERVSEEDTGSVGIGSGELTLGDVVEI  
RKK

20 <SEQ ID No.:0450;PRT;Methanopyrus kandleri>  
MSLVKSAKNDVVIVVGEDIDEFNKGVLSSVCKETGKVILFGKDYLNKFSIDEKLETSE  
ESLPIKRCDAIVDEDETEVDGKLLLDVPADEYTINEVLSLVKEQFKEVCDYERGV EAD  
VLLVIDSDRGRRLRIYANGDEDEVEDKARELCMKVAERVVEERRSAHIDIRTYGFALV  
SVALAIVVTLILRTSPV

25 <SEQ ID No.:0451;PRT;Methanopyrus kandleri>  
LHVVAVDLGT EVISAAVGRRLRSGNLMVKGYSEYILDPTIMERGNVRYVKGVSRIVK  
KTVEEALRDAGVSPSDVEGIGLSMTGDRFTMVEAEASVSPEGKLRIDIGYTLAHL  
EFSPENWPISVDIVDLKVDGAEDPRELGADHPDGLIGSQVTHLQFRAIVSNTSLGLI  
NNLERIARLLNMKLITISVEPLAVAKAIRDYKIENCLLIDSGGGTTDISVVRNTLVEVCH  
30 SIKVGGGRDFTLAIANDLGLTYEEAENIKKKINSPMADSELSRYDLTRREVLEAIEEVAE  
YVRDAVRS AVKSIIRSLDMNVPERVELYGGGVLLDQAETAVREAILDAYRDYLGIVP  
RVEMLEASKIPHIGKQLAGPMRVVAVSVLRDTALCQQCSGRDVKVVIDEFRAPEGR  
YYLEVGGRIEDSVKIPRRTGLKEAIIAISAIKEIILMQPAPVTAELRGRAYAGTVTIKFEGV  
DSTDDVDGVKVNVS GSEVEDTVDTL PKEYKIVQVKEMGPILIPVDELQEVEGGVSET  
35 AGNVTGLKEGLDDSGGNEPR

40 <SEQ ID No.:0452;PRT;Methanopyrus kandleri>  
LNLVAEAVRRFKSVDLIRS QILGLKGLLPRKDRAVEVSTGARLV EEAIEVRNAVRSG  
NREALIEELGDL LIEVEAFLTAHDIDLEEIVERQRTKQRELQMEG

45 <SEQ ID No.:0453;PRT;Methanopyrus kandleri>  
MIGKRKVERLLDEFPNEVEYHRSDDHVVTCPTELYLVPTPIEIVVEILRKLELTPKNRV  
VDLGCGDGRFVISAAYLYGCEGMGVDVREDVLELARAKSETLRVDDKTIFIHSDVR  
DIDLRELNPDVVFVYLMPSLLEEISEELVSCGATVVS YTFEVPGLGVPEVLRLLDDLRR  
AYVYRGVSH

50 <SEQ ID No.:0454;PRT;Methanopyrus kandleri>  
LFVVIRSDSYEKILTSLSDIERYAGIKILGKPRIMDPEVADTIVRELLGEVRRRYPVAAV  
ARVEGEPAEVIRKISEIHPPAHLVITPRHGDVYRGIARRFGKLEELRGYHSPKRRIED  
DREKEGRETAR

<SEQ ID No.:0455;PRT;Methanopyrus kandleri>

VNIVGVDSGRHAEEDGHYNRITACVSAEVDGFNVFTVRDVNVFVVCTREPPNLR  
LTEEVSRLNGLDKDDEYMVVAEPGEFFGEPEWRVSALLGAPFKYAETVAEREV  
EMAHKLAGVYRGVVKMGLKVAQSPSGGFG

- 5 <SEQ ID No.:0456;PRT;Methanopyrus kandleri>  
LPSRPRAVLVERLEWRQESRIDELKELAESAGYDVVGSFRQVRHEDPRYHIGEGKV  
KELAEFVRENDVDKVFENEIKPVQAFNLAGELGVEVIDRFQLILEIFAQRARTREAKL  
QVKLAQLKYELPRAREMVNLAKKEERPGFRGLGKYEADKYEEMIRRKIAKIERELRR  
IEKDRELKRKHRHRLGFELVTLAGYTCAGKSTLMRALTDETVYVDSKMFSTLDTKTR  
10 AVDLDGHRVLLTDTVGFDNLPWLVESFKSTLEETAQADLVLLVVDVSDDELPEIKR  
KLRVCHRTLEEIGAEGPIVTALNKADLIGWEEAERRLRELEGYVSHPVVSAKTGEG  
LDDLKAEMRTVLSRYWKNVRIELPMRNETMRVVSKLHELGNVLDERWSNDGVEVF  
LEVSEKALGTVRGTVKGFGKVEVLD
- 15 <SEQ ID No.:0457;PRT;Methanopyrus kandleri>  
VARDEIAVLTSQSLERVARSRPRGDLWEFLKRAYEKGVKIDAGHLIILSVLEENRL  
LDQLSKTVGEKRAKQILKEAGIYTKTGNVYSGELLKEYINRESRVAVHNRVKDLRKM  
GFKIDGKPGPDGGYSLIQVPEWYRKSSRED
- 20 <SEQ ID No.:0458;PRT;Methanopyrus kandleri>  
MRAEMWATKEYPRVKPEDSLEQAVRELTRYSEYTAVVNGSDRLVGLVTSNDIAR  
GLTAGAETVEEVCRSPESISPSDPITKAVEILTDSDLTVPLEEDMRVVGWVTLRTVV  
ELMSNLYDTPARDLLEKIHENVPGISWDEFIEAATMVFNRELNRDLTPEEFERKISDR  
TFGYVLWLMGGLENLFIYLFRLGEAVVARKVAKRRREL RGM
- 25 <SEQ ID No.:0459;PRT;Methanopyrus kandleri>  
MKTLEISIDKVVEMVLDRVEDADEDTVLEVLSETPAVRREFVTIDPERCVGCKTCYE  
ECPVDALTEPDSTNPPEVDHDACVRCRLCAKSCPVDIAKVVSGEARVTKDSIEVKLE  
EVDVIRRKFVLRKAILRKDRCIACRLCEQICPVEAPNIDKLRIDEDKCIGCKACEHACP  
30 VDAIVIERLTTPPEFEREIELDQDMCIGCEVCVEVCPVDAVEMEGDVANISYDRCIRC  
GECARNCPGTGAIKIKEVREEV
- <SEQ ID No.:0460;PRT;Methanopyrus kandleri>  
VDVIVEVREVVVIELCRACGLCEKECPTGAIEVEDSAKIDEKDCVRCGLCVEVCPF  
35 DAILLGRATCELPKGSYRIEVLTKRPEVSVRISESKCVGCQACSSSCPVEALFGAKG  
SPPKLDVDRCVGCLECVRICPSRAIEPVGGFRG
- <SEQ ID No.:0461;PRT;Methanopyrus kandleri>  
VVVDLHFSFEDRLRNVTINIVEVERPDECAGCGLCAEVCPTGAIEVDERVRDLDEDR  
40 VACSFVCVQACPRDVFRFYEVSFTELKPKRRPVVPKADIEVRFIVDLRTCDRCEN  
RPCIEVCPTGVMREIIIEHRIDL DACHGCLCECVKVCYPYGSVTVELEV PQLKRRSNPR  
LNRELCVECNRCHEVCPTGAADNVDPDGPDPERCLGCYNVAYCPTALKRPDH  
RPRPKCTDEVFYIQPDMCIGCRICYDVCPDAIRIEEITRMPVIMPDLCVRCGLCADA  
CPTSAVDRVPTEEAEREVLRSRISDAFLGILTREMLEAAEEFGSTTRTERDVEEKLS  
45 ELLERKMSEEMIRRVIEFEVKNVIEELMAEVVSGRDSRGP
- <SEQ ID No.:0462;PRT;Methanopyrus kandleri>  
LLQDFLNHILSREGSKRLDAHTSREIMQRPPFRDFPDVLDLRCILCGACADACPV  
EGRDGCPPAMEMSEEGPVLHKERCIRCGLCVEVCPTGAIEMGTLHEEVEERVQPP  
50 KPARIVVDSDL CVGCGKCESACPSDAITVEETAEVDEERCVLCEVCLEVCVPVAGAIK  
LVPTDDELVKRWKEYLEASLRG

<SEQ ID No.:0463;PRT;Methanopyrus kandleri>  
VKRRRREIQSNVQVVDVETGEIEPISHRVPVGPNNHPILKEPLRIKLAVRGEEVVDCKV  
EMGYCHRGIEKIMEGMPWQKAAFLAERVCGICSHAHNMCFIGGVEKLAEGDPAPR  
GLFLRLVLVQELDRIQSHLIANAAYFYSIEHETMFVWNMNTREVLDCIEEITGNRILT  
5 GWNVVGVRMDVTEQLNNVLETLDAIRDDVITYRRIAKNDPFIKLRSGVGVITKD  
HIRKYRVVGPQARASGVPESDMRLQEPVYPELGFKPVYRKEGDNLARILVRYDECL  
QSIELIERIVDELPEGRHRRELEVNAGHVDNRVEAPRGELVYDMELAPGGVVKRVTI  
RTPSPNIRVLEAIAPGSPSIADAVATYASLDPCVACNERFVVIDEREGKVLLEGKAR  
EVIRACSRSTS  
10 <SEQ ID No.:0464;PRT;Methanopyrus kandleri>  
MSLKSALKKLKGFVRSRSIHVTTVNTGGCNGCDIEILACYTYRYDLEQYGIYYHNNP  
RKSDVLIVTGPVTYQWRDKLVKLYHKVPEPKAVVAVGTCACSGGIFNQRGGGRVCG  
PVREVIPVDAEVPGCCPPRPEEIVSAVVDVLPALFRSWEFRGGAREAEQA  
15 <SEQ ID No.:0465;PRT;Methanopyrus kandleri>  
MMRFLIRRNITEEDLNERYAEDPNLVLRICKWILTSYAYRRDIVHRLAELLNVDEDH  
VIDVLSRARSCSGLYGLHSEVEQAERLLDNVDDEVITLAVLMDVVSDGKLSEALEDE  
LLRMFEGRKSVPIDRKELTKFFTSRLRERGII  
20 <SEQ ID No.:0466;PRT;Methanopyrus kandleri>  
MIGFEGRMFVEAVIAGAVAMFLVGLSLVGLSEYSYRMYPEIFRERRVDPISELLAVLGW  
TLLAVSWMRSVPVGIWIAAFLIGYVVNMMPGYGRIETVLGIATFLAALTWLEGLGPR  
25 <SEQ ID No.:0467;PRT;Methanopyrus kandleri>  
LRSHLCVLSLSLVGMAAILLLEHSIYAKAGGVLLASSVIFLVCARLEHVLHRTEQLAV  
VAAILLILGVSIHALRVGHL  
30 <SEQ ID No.:0468;PRT;Methanopyrus kandleri>  
LIVLETLVGITEAFLVGSVFLGLHRKVMARIQRRPGPPIVQEFLHTLKFMLKEGYAPLT  
SAEFLYWMVPVFNVIWWSAAVTISAVYRGNLLPFFALYASYKVLSHGAGVSSGSTYT  
KIGGVRHAIMPAGELALACSLISAYFVTGHMDVTGILAWEHAGPLIEHIPFSALAFFT  
LLWVDSPPYSPLDPSKGYDIVEGYLTEYPGFLRGLMYVAEAIKYYCELWVFQAVFLGI  
SDPVSHLLTMGVLTLLLASMALTPILNPYQAVGFHVIIASMMFLDFLVLG  
35 <SEQ ID No.:0469;PRT;Methanopyrus kandleri>  
VRWVPVAVLVADMTLVWADVARPWLVDYRHGVFSALTILAIALTIFVLGWALSPRG  
DRDRTPFLGY  
40 <SEQ ID No.:0470;PRT;Methanopyrus kandleri>  
VYPSGKVLFIPLGDIVPYLSTINMIILAVLLAVLALPILSNTDVYVEIDHRRPRIKAKIVS  
PREDKIKAAALVSTLAATGVVTTGDVFNTLFLSLLGISNMGLIGTTVEDEFALECAF  
NYGLMCLIASLPLFGGAALILASTGTLSVHELMKMPKGAGGWTLTYGKALLTAGVIG  
EAGVGPFYAVKVDSFRRIWGRYAFVIHLTTLLTFSRYLELLAALP  
45 <SEQ ID No.:0471;PRT;Methanopyrus kandleri>  
MIVPHVVPEITVKMYHVAVAAGIAVGLIAAVDIAADRNPILNRLTMTDALEVGSLLTLLAS  
VGTDLAECLILPGLVVGLAELIATAEVLVARYTDGDSLPEFEPLDMEVLRAPTAIMIG  
LVVYGVLLTGFTGGAVAGSGAAFYLFSTRANRPHYEEWRGMESISGIGWAFWVAGF  
50 STFFLHPKAWLLALILAGTGGILVKVGPKLTLGYAMGYDVRAGARRRVPER  
<SEQ ID No.:0472;PRT;Methanopyrus kandleri>

VSVTAKFSRALNAIRRPESMVSUYCLLLAVLALLGLHCGHSYHREQLYPRPAPQVQ  
MKAGDPLAPYDRGGVPLESPGVTISQYPQFEPVRGWVTSYLTPTFRWLHNRSRHC  
GTTIVSHPGGILDEILYYTRGLDTVLESSIMFVAFVTFVSWIVRTKTIGEEEMEREGGE

5 <SEQ ID No.:0473;PRT;Methanopyrus kandleri>  
VHECEAILYTGAFMIILGTLGAAIGPARSDPVVKSLELATVGVCLVFLAFNHLLALIT  
FIAVGAFPTPILMRILRVEASERDREVLEGSERD

10 <SEQ ID No.:0474;PRT;Methanopyrus kandleri>  
LNWLLLTSLTACVLGSIATVLRDPLQKLPSIALVKSGMICAVAAEGYLDVAAAGVAL  
EAVGTIMFCVYLIRIEEVRSA

15 <SEQ ID No.:0475;PRT;Methanopyrus kandleri>  
VISAQAVMAAIVILMSLRLLVARDLYAQMLYLNVVGFGLAGLVATTWRTDMGLIAALC  
VFIFSTLESNAVSYTIQKIEIRRAGELD

20 <SEQ ID No.:0476;PRT;Methanopyrus kandleri>  
VIGLQEGQLQILQIVVGSVLAWLNFVIVDILMGLPEAPGVKGAEAGRSVERRGGDIAG  
GYFMGNIVCSPDASAGTLLASSGYCYCLGGPEGGLVAALAVYLGNRCLADPGYAGTL  
GSLTATVLTLYDKVLGMDPANFVAGMVIAIMTIHGIDHPRASRLIGDIARRMGRGAE  
K

25 <SEQ ID No.:0477;PRT;Methanopyrus kandleri>  
MKDPGLVAVGVAAVAFGTALALGLPPIQRDKPRRKSWEVSAAFPTPVIAAGATVL  
VIRVIGYHPPILAIVGAVVGALSAAFTAYIEKVFPPEAG

30 <SEQ ID No.:0478;PRT;Methanopyrus kandleri>  
LGGSRSGGFILSKIIMRPQVTIEDDWIIFEGEEGFVRLPKDPYKVIEDFEEYGYFFDEE  
HRRDFAAMYMTLIVEQTPVLLVGPPGTGKTKLVRLIGELYDVPVVVMRGHQEAREQ  
EFIGGVDVAALPVADKIAEEYTEVGNMEYEEAIEALKEFIYVGGYLDVNDARRRG  
ACLFIDEVNRFPGYMIPTLIHIFEKDEVIYIPHSIDFGETGAIMRIGALNPEGKGT  
NFDEALLRRVELVPWGEYDVEIYKRIAIESARQIIELTKMAEEVLEDLASLIKDMGKGV  
DVAKDVAQTVAIGIKMGYDVTVARNVANKILGDMLLDSEKAEFEARNALERKIK  
EKLKPVFKS

35 <SEQ ID No.:0479;PRT;Methanopyrus kandleri>  
MDPNHVKDEVGQDPSDYTASLEQAQFVVEGIERRGKFRNPLLSTVQANDMIKSIPN  
LSDDQFRQQVRNLLRSTMGELEEWAKDVGQDVVRRVLEELKRAEEHGYYVPEELK  
ERMEELLQDLQEGPEEREAEAGDGEGPSAGASESPSFVSEEGGGGEPTGESGPT  
40 PTESASGVGKGGDPAFTIDRSFPERKKFLKILQSESLKILDEGHEISREFEDVEEGEA  
KAHFGWLYGFDKADFLSDVDWERSLEEGYFKNVPLTLRREFRKNKDEPKVAILLDS  
SGSMSGDKMEVAATLAAALFETVGIENIGLWAFRSEVHQLKDFEEVINRRKLIKILG  
IPAGGGTDPVKPLIKVLDSLENVDYDKCKIYITDAIFMHDDFIRIRNLLSDRDDVELYA  
LLIKDEFEHTGPTIFKRITEEFDGGVVQVNPREDREGVREKLRQFVDMISD

45 <SEQ ID No.:0480;PRT;Methanopyrus kandleri>  
MRSGIRKFRVTHKTFMTRKMDDEMAVISFVDDRHYDTYKEYMERLKELEVSCAVG  
WVNSLGCEAFFPKSVESILENWSVEAASQMIHAGVTDVVLLEHNYSKYLFREFHT  
KFRRSWEKEGISYRAPLGELYPDYVNEILAHNFLRSLSDVVRGMINVSLHRDRMVV  
50 KTSRRECSVWYEDIREAMETMQAVERALVG

<SEQ ID No.:0481;PRT;Methanopyrus kandleri>

MNCVGIAVSIIFTSTAPEVPTNLRSKLLSSPSTTSNLSRPESSSSAILARWASDLRK  
GDMKGLLTQTSTVSSGNETRMVLRSTTGITSKLTLNSRDNAESRGSFAYMVKVL  
PTLLDAVVEEVNADKDHSETFRTEPWSGQPDEVVETRYIQLVRRLVGEGRNVLVG  
EPGVGKSTTAIAACEKPPIVLTFGGNLPVSILKTFVNTLRVTGPRRWISVDAVVVG  
5 AVIEGKVRRLPLIDEVVVFSVTIVTWCLTRALKIPIIAMLATDKKYAEARKILELAGFE  
VVEIKPDKHTVEEVVLAHGLQGSPRTDNPREELKRFSESSNHSQSDE

<SEQ ID No.:0482;PRT;Methanopyrus kandleri>

10 MDEVSGNRGLISKTVNDLRDEGLIEPTHRGFALTEEGFLELVRPNTDYEYRNEPVRL  
STDGPEVEAFLRVITGRSKTRTGSIATTRCDMRCKFCYYNLVRDHVELTPEEILRE  
AEKRVKAGNREVVIQGASPHLTDLVEAVELIKLELGVGVGTGPLIPLDLLEDLQ  
RAGLDYKLKLSLGRTPEEWEAITGRRRGFEFFWRVVRWCHEHGLEVTFFVGGVVGL  
PGVPPEADAERILSILALNPRKRIVQFNPAQDPARGPLSPLDRLELIYKTVRSKLPED  
VLVKSCCISPMTWSPLYDIRRYLDKVVCMGLGIECREYDGCPTGRVLEQRIMNELYE  
15 KGSVSTEELARRLRIARSRLKRRLESMESRGLIRRTESGWTIARRTS

<SEQ ID No.:0483;PRT;Methanopyrus kandleri>

20 VVESSTTSWRRPVVRGHRCTSTTRMLPVKAAREYQEAFSWFPDRVVVCYAMKANF  
NPYLVEHIVDETRAADVSLWEMKAVNAGAETVVVNGNAKSSDEIRAAVERSWSVI  
NVDSFEFFQRIEKIARHEGERALVALRVNPKVSPDTHSHIATAVEGSKFGVELEIAER  
VCRRMIESEWVEFLGLHYHIGSQITDLRPFSEALRSVRTFLEDGLIEEISYLNIGGGL  
GIRYRRGEEVPSPHDLAEELQEDLKELHSESSGFDLYLEPGRSIVGEAGILVTSVRQ  
VKRGRRRWVFDVTGMNALIRPALYDAYHEVVVHGGDYSATEKASVAGPLCESGDV  
LAEDRELPIDISEGDLVFLSAGAYCESMASNYNCYPIPGSVVVRNGEITGVRRVQD  
25 YEAFSKTWW

<SEQ ID No.:0484;PRT;Methanopyrus kandleri>

30 LIVPGTPIHIHRLAKKIMMELDAFEGSRPLDDVDVLIVRGMSRGEDWDLNLQGYL  
ESVLERCDVEVVDPEPESPEGKELIEELGKFVVERIQAQYADEEPVSVRPVENPMEAV  
DAFTQGEIFLDPLGFERLKRDLALGCVAAYTFGRTPDDLGVFLAAWADRSGIGPK  
SVELLVANLKG

<SEQ ID No.:0485;PRT;Methanopyrus kandleri>

35 LRSCFPDVQSADPQIPAHLTRVGISGIKKLVKIPRRGKRSIVLVSTFNLFDLPAHQK  
GIHMSRSHEVLQEVLEELEMSVEGSDTVIEDLCSRISRLLERHDYATRSEVYMTGE  
LILSRRTPVTKLPTQEPYKIIGRAVSKRTDNGIETRKVMGAEVVGLTACPCALEMMR  
EHGKERVKHRLMEELDLEEEEAEDLAKKIVREDVHPMTHNQRGVGTILIEVSDVHR  
VSINDIIEIIEESMSAPTYELLKRPDELKVTCSACENPKFVEDCVREMIRRIVERFDYLP  
DDAVVIVRQVNKESIHKHDAFAERVTTMGELRKELGS  
40

<SEQ ID No.:0486;PRT;Methanopyrus kandleri>

45 VPGLPIKLRVEKAYPEDVGKRAVRMDKASRDRIQVSEGDVLKITGSKTTVARVLPK  
KEDVGKGIVRMDKYERQNASVGEPVEVDRAEEKVAKRVELMPTERVVVPVQAG  
LKEEVEEELTREHEQDILEQIKRYLRSRAQQTPIPATHRDVIPLEVQGKTIAGHVLIK  
PDSLLVVGIEPEDATVIGPETEIEVKPYSEDLAKEAEIPDVTYDDIGGLDREIELIREYV  
ELPLKRPELLKELGIKPPKGVLLYGPPGTGKTLAKAVANECGAKFYSSINGPEIMSKY  
YGESEARIREVFEEARKNAPAIYIDEIDAIAPKRGETGEVERRVVAQLLTLMDGLSED  
ERVVVLASTNRPDDIDPALRRPGRFDKEIEIGVPDKEGRKEILQIHTRDMPLADDVDL  
DKLAELTHGFTGADLEALCKSAGLKALRRRAIRKIGAKLAEKGEKEEREVAVKVSELS  
50 DEELMEVLEKGLDRARIPEEKRALRRVLREAEKEEVEVAYTDALDKVLEAEELPE  
IREELKVTMRDFMEALKEIEPSALREVIVEVPDVSWDVGGLEDVKQELKEAVEYPL  
KYPEVYEKLGTRPPKGILLYGPPGTGKTLAKAVANESDANFIAVRGPEVLSKWVGE

SIPGDEVVWAKVDGEAKLIPIEDLYELWKEGRDVEVAALTEEGVVWSSVDRVARHR  
RRTGLVKIITRTGREVIVTEDHSVFTVRDGIKVDVPTSELSEGDWIVLPARLPAGDSD  
EIDGIKIDEDLAFLLGLYVAEGSLTNQKDAVRIHNKDPEVIEEIDRIVREKGWEGRYYE  
SDHSYWIKSRLRQLCEKLGTKAREKRLGPLLSLKPELLAAALRGYYTGDGSFSVK  
5 PHGRSAIIEATTVSKRLADELLVALQILDIVARRYECDDTKGSTRYRVMITKSEYIRTF  
VEKVGFAQSEKNERIRKFLAERKWTRGRSDIPTELIGSPYTYVEVEYISDRVAADGG  
LMKAELEHLYFDKIKEIVPLDRDDEYVYDVVEVKLGHNFBVGGQGVLLHNSEKKIREIF  
QKARQTAPCVIFFDEIDAIAPKRGTEVGGSRVTERIVNQLLTEMGIEATEDVFVIAA  
TNRPDIIIDEALLRPGRFDRIVYVPPPDEEAMKEIVKIHTRDMPLAEDLTVD DIVEILRR  
10 REREEDAKYTGAIEAVCMEAAMLALREVLDELERIEKESETEEELEARKEALLEEL  
RVERRHFKEKAVEKVPSPVPEKLEEEYEKLKEEYQRLAG

<SEQ ID No.:0487;PRT;Methanopyrus kandleri>

MLLRCLRWLRLLGYPTVAAHEVVDPTKVEDEDEVLFVEFCREHDALLITRDRQLARR  
15 ARAVLITADSVPEQIAEVLEFLGDEAFDPDESRCPECNARVRRVTAENPGPFVET  
WECPECRRKYWVGGHWRDMEETIDRVKKALRRVQRGHLRG

<SEQ ID No.:0488;PRT;Methanopyrus kandleri>

VGEKLTLEEGEFLVRLARKAIVHYLES GK KIEEKPTQRLAEKRGVFVTLKKYPDDEL  
20 RGCIGFPEPIKPLVEATVEAAISAATGDPRFPMPMRDPSEMEEIKIEVSVLTPPKKLEV  
DNPKEYVEKIEIGRHGIIVRRGARSGLLLPQVPVEEGWDEIEFLSHACKAGLPPDW  
WCSPDCEIYVFEAQVFEEEEPEGPVRERDLAEEQ

<SEQ ID No.:0489;PRT;Methanopyrus kandleri>

LIVMTVFAHPDDMEVHCGGTVRKLSSAGHRVIEVIMSKGNNGGDEEVREREAIEGA  
25 KCLGVDRVEFLNHEDGRISVDPESIDAVRALISKFEPPDVVFTHSPNDTHQDHRRTFR  
IVTSAVSKFPEVTVLMGEGPSTVGFQPVVYVDVTDVLEKKLEAVRVHRSQVERGAIS  
EEMVMKTAEFRGMEIGVKYAEAFEAFRISGSLLLG

<SEQ ID No.:0490;PRT;Methanopyrus kandleri>

LERIVVLIPAKHESVEAVEKPLRSVLSQKGVEIEKVIAAGTEDDHRRFSRRFADDDI  
30 VEVVKAGGNVKGETVNNALKRV SARADYVFLIDAGDELGSDRYIRELLEEDATLAFG  
RIRYCGRNLTGLMVG LQFDVVSSGISFWGNVVGSA PVFTTGTLFKATFLLEEGLPE  
NLAEDVTGLIHTWRKVGFVYRPDLEVWMDDPASLKENFFQQSRWWAGMYQACA  
35 EALRSRNLP GIGFAVFLG SLLASFLT TYILPLVYPWTILISLAGRMIYSVLAAL ECSNR  
RGPLWALAVMPCQFMWTF FVEWA AVYGLIWLAI RGNVWYRTTRASEGDDHD

<SEQ ID No.:0491;PRT;Methanopyrus kandleri>

LRAALALEDTIVHGELFGSPREAEGEVVFNTSHTGFQEALTDPSYRGQILIMTFPM  
40 QGNYGILPEVGESDRVQVEGFVRYLHDGPIHPRAEITLDEFLQDHGVPGIAGVDTR  
MLTRKIRTEGAMRGVLVPYEPDDQPSDEELLERVREVPHISEMDLVPQVSVREEYR  
FSDGKPEIVVIDCGVKRSILRELAKRGAGVTVVPYDTS AQEIMDIDPDGVVVSNGPG  
DPKRVRET VETVRELIGQVPLMGICLGNQILGLAEGGDTFKLKFGHRGANQPVKDL  
DKDRVYITSQNHGFALDPDSL RDTPLRVRVVNVNDGTVEGVVHTDAPAFSVQFHP  
45 EAGPGPWDTKWVFDEFLAMCREH

<SEQ ID No.:0492;PRT;Methanopyrus kandleri>

LGLGVALDIKEGKVVRSPDVREYIPISRRYDL PDDPHELATLLVERYDLDFVYVAD  
50 LDAILRGEPADTSDALESLEKPVFVDVGACEPDLPSHAHRVIPTECYDDKSEYIEDLE  
EDES AVAGLDLNGSEILGPWDGVGDFLDTVVEVVYRRDPGV LVIDVGAVGSKEGPP  
YEAATSVGMYSTALIGGGVGHP EHVKLALGTPGVSGVILGTILFEGVDPMKLEQARR  
EGKRLRVHHMGLEEEYLNLIKEGKKTVEGRVKDDKRARIKPGDKILFNRRLLVKVID



VREYDSFEEMLREEGLENLVLPNVDSEEGVEIYRRFYSSGKEKMFGVLAIEIEPIMDL  
WEGICD

<SEQ ID No.:0493;PRT;Methanopyrus kandleri>

5 MDVTILEKLYRNSGAEESLRTQVQSVISDFDAELEEIRKNFRAWAVLRIRGPEVEEA  
AEEIVEEFDTVRSLFDVSPGDVIYGRIVDLYRVGYGIYVDIGVVGPEVVDALVPLYRL  
REQLLDGEKASIRDIGRSFGFVENMPLEVEIVEVNEERGEIEARLTDEQVEYLLEMA  
ADPYDRMIVAGITRKRLQRLNLRAGFGRRVIRIERWGLLENEVVFDDEGVDAPGVLAKE  
10 GPYLRGGEVELIYDDKFLERIGFIPSPEGPIL

<SEQ ID No.:0494;PRT;Methanopyrus kandleri>

10 LRDPIRDLERVGCPEHVIHCKAVCRLAEEMAERCEEDVDLNLVRTGALLHDIGRAR  
THGIDHAVVGANIVSELGYPKEVVRIVERHIGAGIPKDEAKKGLPPKDYIPETLEEKI  
VAHADNLTFGTEHVPIKVVRKFSERLGEDSPAVKRLELHNLVDLNAIPPELTRW

<SEQ ID No.:0495;PRT;Methanopyrus kandleri>

15 VGGSNVYAELGEEDLEVLRDVTLSLLDSEKGVDPVAKRTVDVILKREAIDEEIAEEL  
GVDPREVRKVLYKLHERGVVTFRKERREEYRYPVYSWRLNLREVLRRCLEERRRE  
LEEVERALSNDMSHPMFHCGNDDCPRMSFEEAMEHEFRCPKCGEVLEEVDLTEE  
20 RRELERLAEELKVEIRRLLEELRERLG

<SEQ ID No.:0496;PRT;Methanopyrus kandleri>

25 VLRLPEFLVFIDHPSKKEVPDSEVEVARRRVEQLGGKIVWSIAGSIRKYHPDVRYVE  
RLRKEGYELALHLSPGYIGLHRTSLATGVPEGKIKEAVYDALRIVDGAKYLTTCGPLH  
TALFRGKVPRRGWKDDLGPHELHPSVVYGLGQAAETGLDLLVGARSPEWIKGILDE  
LEVKYIEGIGIDNYTIDDEKPEEAAKMVAEGECSAVIVHPRKDTFRRLHKFITCLKRIQ

<SEQ ID No.:0497;PRT;Methanopyrus kandleri>

30 LTLDERDLELIREELGRDPNATERAMFENMWSEHCAYRSTRHLLRQLPSEADHVIV  
GPGDDAAVVAIDDEWAVVVGIESHNHPSYVDPYNGAATGVGGIVRDVLSMGAFPIA  
LLDPLRFGPLDGERVPYLVLDGVVRGISDYGNRIGVPTVGGELEFDPSYERNPLVNV  
MCVGIVRRSEIVRGRADRPGLVLVLVGARTGRDGIGGAFASEELGEESEEDRPA  
VQIGDPFTERQLIIAIREAVERGLVKGCKDLGAAGLTCAATEMAADGGTGVEIDVFKV  
PLREEGMEPWWEIMLSSESQERMLLVAPEDVDEVIEICRKYGLEASVVGRTDDGYL  
35 TVKDGDDVIARVPAEFLADGAPEVEWEEEPYSYPENVDPPEPDPEDLVRSVLSSPN  
VSPALREWVYRQYDHEVQGRVVKPGHDAAVMWLQHEGLEDVALALTDDSNPRH  
VLIDPKTGTEGCVAEALRNLATVGAEPCLVDCLNFGSPENPRVYYQLRRSIEGLGK  
AAREFEVPVVGGNVSLYNEHEVDGPVNPTPVIGAVGVIRGLDYLEDFFPREPEEGEA  
VIVLGETREELGGSLYLIEYHGIKGGKVPRVRYREERALHDLLRRIARKNMVSSVTD  
40 VSTGGLLAABAELLGPVGASLSLSEVPNSVSRWDFLLLSHSGRAIVTTDRPDDVLG  
AEEEAGVPAQVVGEVTGDGVLRISVGPVDVSLDREELEELWRSPLHYLE

<SEQ ID No.:0498;PRT;Methanopyrus kandleri>

45 VERIRARLNLGETLLEWERVLCARCDGCGACESRCPNDVPRRLFNVLAASGRFEEAL  
SVASDCTVCGLCERLCPHNIPYTEVITDLRREEPTPEAVRRVRRTGTPYGRKLADES  
EPLQGDGVAILGCTIRSPEWLRRVIEIVRRAGLATLGEDEPCCMNFARKRGEEVPE  
ETVQRWCSSLFDDFDTVVVFCPGCYDFCVELDERPLYAEIAEFDGIPEGAAAYKSP  
CHLVRHGVDDHVLRLPDVELPPRRHRCCGGGALVRKPSESTVRAYERLGKPVLT  
50 PCPMCVTTLLEGVIDVRPLWDHVVDLSR

<SEQ ID No.:0499;PRT;Methanopyrus kandleri>

VPCKVRIRGIYSTALTKICLDHGFIVTQPSDDIRRRFPDAEFDGSPDVDVRDTRNRH  
 GIEIQGPADDVRELVDILQSEVWATVTADKIGEGSVFKGVVREIDDRAGVAVVDLGN  
 GLQGFLSEDESEVVEEGEELVVQVAKSVSDGPKLTTEVTVAGEYAVLVPVEGIRV  
 SRKIRDERERERLRLGEALVPEGWGLIWRTAAGKSGEELAAEIIDLIEERKQLFK  
 5 RAEEMSEPGPIRDVREMELEIHSLAKSRLDSVRSEVLPTMVGHYFKCRSLAGSVA  
 VDTVEPFLDDLDEEVVAERLIRCLTRSEGPSEGDRIDIVHVKPGQGVKKLGGNPKVV  
 EYDPVEGILKVRREMRGPGFYDGDIDKPIEKGDYASILPDGSMVTVHQYFNKDGEK  
 GRYYNIGTPLFVKNCVRYVDLEVDVVEPEEGEREIIDEEDLERAVDSGLIPEELAE  
 ALETAKRVEKRGMKVEVKPYPVWKGFEHG

<SEQ ID No.:0500;PRT;Methanopyrus kandleri>  
 MGDPEVLLEVYEVIRNRIEERPEGSYVAELTEDDDTKPAINKICEKIIIESGELILAAKD  
 GDREGVYESTDLIFHVLVLLAYLGIEIGEVFDEFERRK

<SEQ ID No.:0501;PRT;Methanopyrus kandleri>  
 MERVVIVGAGPAGLFAAREVALRAERDVEVVVEEQGPSLEDRLESGEVMRGVGA  
 GGLSDGVNLNRPDVGDLVSIVGDKRSANELVEYVDEVFLKHGAPKELKVPEGPKV  
 EEIALRAAADVEFVRIPQRHIGSDNLPKVGISLVRELEELGVKIVPETRVERILADEC  
 VRGVKLEDGREVEADYVIAAPGRVGANWMMHEAKRLGLRLRYNPIDVGVRVEVPR  
 20 IVMEPVVEVSLDPKFRTRAPTYDDPVRTFCVCHGGYVVKENYEGFVGVNGHSYRR  
 KKSSENTNFAFLVSVDLTEPVENTIEYGRSIGRLATTIGGNRPPIIQLRGDLRRGRSTW  
 DRINRSHVTPTLMDVTPGDISMALPHRVTVDIIEGLERLDEVIPGVASDSTLLYAPEIK  
 FYSARVETNEDLETRVENLFVAGDGAGLSRDIVNAAATGVIAGRAVAERIG

<SEQ ID No.:0502;PRT;Methanopyrus kandleri>  
 MEPIFQTLALLIATQTGVEHDTGCCTVLVHVHHGCDVVAYRRDAKFP AEILVRTEW  
 AGRRAIKEYKIQGGYFCHTVITEDGWIVTIGGRDIPEVNRKLEKLGAEIVSKGRIKKDE  
 IEKAGELLKEARWGHFVVKSPNDIVGVASYDYRISSPERIDMFKIKDGEYVKVTNNP  
 RYYDRGRSEEFGKNPIDAAIKIAGKDPYGLHRRDIITYKLTVDETSSSVKWWASYDG  
 30 RALLGGASGEPDPIRFMGKTIAANEIPRVPRRKPLGEVILRVCREHEGKGELPNPAA  
 VAAALISGAVFVAFLGQLSLQQRNLY

<SEQ ID No.:0503;PRT;Methanopyrus kandleri>  
 MNGKILVVTGVAVCLVLATGVVAFNPANKVKEFDPKHALNFAKNICKLGPYGGNE  
 35 AELKAANIMEAELKKYGLNVHEEKVDLGGGKYTYNVIGEIKGTDESNKYVIVGSHIDS  
 PGFCEGATDDAAAMGIQVEMARVLAKNFRPKKTVLIIGFGGEELWFKGSEAFVRKH  
 PKIKNCEAVIDLNCVGAGQNVFLTQKSAPKPVGEDPKLIKLLEECAKELGHPVTVG  
 DTTYPSTDPFYHNEIKRVPVCQVMSQPFVPPWSESNTADKLDPKDMEKVGETV  
 TLAVVKLTAEPASKPLWEAKRAEESAGGGWPAPMWWAPALLGVAAALLRSRGR

<SEQ ID No.:0504;PRT;Methanopyrus kandleri>  
 LRALLIVDMIRDFVEEGAPLEVPKARRLVPRIARLADEFRERGDLVVHVWDEHYDD  
 PEFKVVGEHAVAGTEGAEPVEELKPEDGDLVVRKRKYSGFYGTSLDYDLRSRNVK  
 EIYLTGVCTDICVLFTCADALMRGYRVVVRDCVASLEEEESHFRFALKHMEKLGAEVV  
 45 DSEELGD

<SEQ ID No.:0505;PRT;Methanopyrus kandleri>  
 LTAVKRILALVDGEHYIPVTREALETVEELDLGELVGAVFIGGTEKISEPEAVKRELGV  
 RVWLSESEDEIPVDMIVKVEEEDVDVLDLSDPEVVSNDNRFEIASAVLSAGAEYW  
 50 CPDLRLKPVFHDVLEKPSLRRIIGTGKRVGKTAVSAYTCRVLNARGYNPCVVMGR  
 GGPPEPEIVRGDEIELTPEYLLKEAKGKHAASDHWEDALLSRIPTVGCRRACAGGL  
 AGRTFTTNIVRGAKIANELPADFVVVEGSGAAVPIKTDAGIVIVGANQPLEHIGGYL

GPYRIRMCDLAIITMCEEPMADDAKIRKVERTVREAGDGIEVVLSVFRPKPTEDVEG  
KRAMFVTTAPEEVVSRLVEHLEEEYGCEIVGTSPHLSNRPKLRKDLEKYIDDADILLT  
ELKAAAVDVATREALKAGLGVVYVDNVPiAVGGDYDHVGD AVENVAELADRFEFEG

5 <SEQ ID No.:0506;PRT;Methanopyrus kandleri>  
VRKKLPVAPFDRALRAVGEDVRVSRKASETLRDHVQRLAEEIGKRAGEIAASRGSR  
FVERVDVERAFAEVVFGIDSD

10 <SEQ ID No.:0507;PRT;Methanopyrus kandleri>  
LTKVLVEPDPEEVKQLSEALGRQPVILAGICEAEYRGRAESVAGPALRIAMCKPDGT  
FILHNAMEKREPTNWNPA PSRQSIEVRDGCVVLR SRRLDVPEEVVVYFHKVLLACS  
LPKEGAKSEDSVFSLFRSEEDMKRVIREDP SVIEPGFRPVGEEVECGAGVADVVG  
DEEGRFVVLELKRTRAGVSAASQLRRYVEAFREER GEEVRGILVAPSVTDRCRRL  
EKYGLEWKKLEPVPLRDDGGKKQCTLTEFLAGEGD

15 <SEQ ID No.:0508;PRT;Methanopyrus kandleri>  
VVRVKICGITRPEDAATADEAGTDAVGCVVEVPVSTPRKVS AEHANEVFSVSPFV  
SRVAVLMDNLEPIDRLEEATAVQLHGTEDPETCEELSELGLDVIKTFWVDQRGSWW  
LGEELIGDEVLA EYCEIVDAVLLDTKSAEGGGSGERHDWDASARLVRRLDVPVILAG  
20 GLNPENVREAVEKVRPYAVDTSSGVEKEPGIKDPEAIAEFVRATKSV

<SEQ ID No.:0509;PRT;Methanopyrus kandleri>  
MPVTASSQLQFHTPDAGVKPDVYWADFLGYPTGALFREVIMPDSRGEIVTPPTHLG  
GEPYRQNSEIVQKLVERWEELSEKPNDRKVIALVYYDWPPGRESIRASGLDVFGSL  
25 VNILANLKAAGYNVSTPWDDQLLKIVQLERERRWDEAAALVRNLSQELARMIELYGV  
NVGWWHGDYLRAMYDRHAYLATIPVSEY LKWYDQLPEPVRLYVEYGIPGLLYGYA  
EPLHRPLEGEALETLSRNLSAMLRDIETLLSNLGV PDDTDAMKALRELADALLRYAA  
GKAGHDELERAFRRRAVDLGRKLEQRYHTGIFGWGPPPGDVMVVDNKFVVPGLKF  
GNIVLLPQPPRGLLWGMAAYHSLLLPPPHYLLAVYLWLKHHVDVIVHVGAGHTLEW  
30 LPLRRTFLSHLDFPTVLLGDVPHVYLWCPTSGELYNVKWRTSAVLSYLPSPAPSTA  
YDFYLNLT LKLLHSCFHFVEGNPEVEEEKLPVIMELLKRTRVYEWMLT WEDVERM  
ARTDFNRLVSELH SYLHMMQAHGESPTPVQLTRHLHVYGLVTSEEIREYVSALLFR  
KYLELVSKTYGGDLESILSPENIEKYGDKALELFDLWKEWQSLIDHPSELRF RYPEL  
YREMERIRDLV VTSAKLEIENLLRVLDGQSV PVGPPGDPTVDTSVLPTGRMLCLLNP  
35 ELIPSETAWMLSDGITLKQRTL FVLSAADVLNDRGLSLAVLLRSSGVDRVGERYVLS  
GSPVYSPVLVCQGLEAIFAQTPAGRALLKAHVEAVLRAPKDLFAVANLLKTL SDECE  
DPELRESLASIRLD PGLLEKGLVLRKFSASLGDVDVRPTFRPDSIWYAAWAVKFLY  
DVQVNGTPIEKAAIRAALGVYCPADYTLGVKAATERLKPEEWEILARSLSAKLE NVLT  
PEGSESAPGLLRIDLLIVDAVLKPVTDR LWGVLAEDAIEFYGGLLAVARLIRAGLPDP  
40 LVLDEVSSL CIRQLAGELSREWHSLWMNKDWLLSLRTPGEANDFLERVSR LMAWM  
ILLGPTIVKPTTMAERA IAGVLGQLFFELVQRLVFDREVVEHLEKLN PYVVESIAGR VF  
VLLDSDFGLQLLRRSYHYQVLCQLGKLEEA EKWARRFRETARRASLETFR RIVSKY  
GPCGCLAIVLNPVLRGIVEELAPAAELLVPN PFSAGVSPVISTVSNSSVGRSPAVSAA  
RARGSTPKFTSSAAGTTATTTGVRGSPSNRPRRVEPVPGISLSGGSPARSVSVGST  
45 GSAVSAKVLKRQGSAGSPVPPIRLRYLVMAAVVGTLCWLWVMRRASVPIKPTW

<SEQ ID No.:0510;PRT;Methanopyrus kandleri>  
VSRLYSIVAVATMVLLTGAAADLQEYKEAYSAAAKIEEYGEKV KESLNIIGGFQPPCG  
LKVIPTAYPYMAFKDDKDAISKVFQGT DVAESGSWTEVGP GDFRALIYGIHELGENW  
50 FERVKVADLAQKPADYALKVHEETHAWEGAVEKVGETWEDWENHKGDENLKTAI  
ASRVLA VLGVLVSENWRAIFNEVNKAAQIAENVGRVTIPAGVYGNDSPIELDFSKCE  
SPEDVVNVIKAAFGLDTPDRVIELIDSEAKYFGLGDKFVENYMEGGQYQPHEGGFT

VDEMKDVIEKFKSGKDIYGQELSEEALAFAILFNIEDVWATYEEYVHQYGHFFPPAE  
 SDLKLACDKIEENAKIVEDVLNKLNAWADVGITKAEFESNPLECAPAVKDWAVGELF  
 GVVEKLEKRKIPLSPVVLAGLLAALAVLRRR

- 5 <SEQ ID No.:0511;PRT;Methanopyrus kandleri>  
 MVSPFSIQPRPPTPIMLIRGCGNTSLTHDKVLTFFVATLCLLGAADLVSDVQQRC  
 EQAVDWLLTNQQPDGGWLYEGYGDKSSAMDTGVVLLGLCEAYDRLPQDQQCKV  
 REAVDRGVEYILKCWDGDRKMFWDYPDGGGKEEYMPMYTVHALMGLIAVEKKFP  
 DIAEKHGVSKYIDEALEKLLSMQNDDGSWSNFGPGSWSSPGRCTGLVWLAEWS  
 10 GRYGPSDERIAKGLKYIENHLEKSPLGGLISSNGPKIDFTVWDM LAFYFSGDEYYRS  
 FVPKLQEGVLGFQHKDDEFAGAFAAHTSVYDSEYGPEGTAAPCPHK TARVLFALML  
 TGADPNDDRVRKKA VEFLNTKSQSEGAWFWPTMNDPSKPDNNPMKAYCTGWCLA  
 ALGAWLQKVPKKHGIPVSPLMVALAFIPARRAWQAGTP
- 15 <SEQ ID No.:0512;PRT;Methanopyrus kandleri>  
 MSEALQRLREFAKQVLKCEKDEPVRIKRTTSNIRYDPEREIFTLGPDKLERRPRT  
 LKGSKKLAQMLSVAFAKELVEKGRSATLREIYYTSEGWEVDFKDQRESDAIVEDLE  
 ATLGLKREEFGVWPEEDGA AVYGDLLVREDGVEIHAERAGISGYNIPPNVDAVEILD  
 CGAERVIAVETMGMYRRLVQERAHEKLNALIVGLKGQAARATRRLRLNEELGLP  
 20 VYVFTDGDOPYGWHIYMVIRSGSAKAAHLNEELACPD AKFIGVTATDIVEYDLPT EPL  
 KKTDYKRIEELRRDPRYYDPFWKKELDLLEKLGKKA EQQAFKYS LDYVVKEYLPA  
 KLDELE
- 25 <SEQ ID No.:0513;PRT;Methanopyrus kandleri>  
 LAELADEFYESAERVKIPKDRIGVLIGKDGETKRYIEEKTGVELRIDSKTGEVEIRPTE  
 RVKDPLDLIAKECVLAIGRGFSPERAFRLREEDASLEVIDLYELVGRNPKALERQR  
 ARIIGREGRTRQLIEELSGADV SIRGKTVALIGTPRQLQIARKAIEMLASGAPHGRVY  
 RFLEDQRRKMKREKLRLWKDSEPPDIL
- 30 <SEQ ID No.:0514;PRT;Methanopyrus kandleri>  
 LTLSEDKYFSAIEELEPKPGKVRLKLEKTLEDLVVEEEVFDQYTLMTLYELSRRGYIDG  
 LMGFVKTGKEANVARGVRGDELVA VKIYRAATSDFRRMWRYIRGDPRFKNIGRKR  
 HRIVYAWTEKEFKNLTRAYEAGVRCPEPIAHMNNVLIMEFIGDDEGNPYPLMKDNP  
 PEEYYAEDVLSNILDYRMYRKAEIVHGD LSEYNILYGGKGDYRIIDFSQGVVLDH  
 35 PIAEELLIRDLRNLIRFFERLSVDTP TLEEAL EYVRG
- 40 <SEQ ID No.:0515;PRT;Methanopyrus kandleri>  
 MGKRIDDETLKKIRLPKEGEIFGVVEKMLGNDRVQVRCVDGKTRVARIPGKMRKRV  
 WIREGDVVLVKPWEFQPERADVTWRYTRVQVDWLKRKGKLDERTVKLLEEIIPGA
- 45 <SEQ ID No.:0516;PRT;Methanopyrus kandleri>  
 VDVEERLKLVTRNAVEVVTEELRQLLEEKEEPVAYVGFEP SGKVHLGHKLVIDKMI  
 DLQEAGFHVILLADLHAYLNEKGTLEEVRELADYNRR CFLAMGLDPNKTEFVLGSE  
 FQLDEDYALDVYRMARHTTMRRARRSMDMIARSEENPPVSQVVYPLMQALDIVHL  
 50 NVDLAVGGLEQRKIHMLARDVLPKLG YDSPTCLHTPIIHGLDGDEKMSSSKNNFIAV  
 DDEPEVIREKLRKAYCPAREAGNP ILEYRYFIFREYDEV TIERPEKYGGDV TYTSY  
 EELERDFVDGELHPLDLKENAAGYLSEILKPVRKAVSAPS
- 55 <SEQ ID No.:0517;PRT;Methanopyrus kandleri>  
 LICHRCGREVDTTIDGLCPECYLEEHPMIEVPEGLEVRVCAQCLARHTGLRWEDPP  
 EGVGSIEELLVEYVLRELEENLRTL PDVYVRIKPLEVKGEPGGPGARVLVELLAEGE  
 WEVGGEVLTRKYHLKVPVWFALCDRCMKFRSGYYEAILQVRSLRGK LTEREREVEE

NFVTEAAASLLERDPMAYISDVEYPEEGIDFYIGSLNAARKLARRLVDAYGGTVGES  
HKLVGFDREERSKRKYKAAISVRIPHFRKGDILLVDGQPYLVTGLGERCSLRHLISREV  
VKRKWEELKGVEVLKPEPAVVEDTPPRVVLERTGETVECYESDVDLHVQQRVYVIL  
LKGVAVVVPEEYL

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<SEQ ID No.:0518;PRT;Methanopyrus kandleri>  
VLALNVDTSLVENLVYFIVSIILFWLFIIRVYYQVVLFRRIEGEVERIRKIDEKVQQMVVR  
RARCDREEAETLVQRAANLFVVQPVLDPHGIIERLENLIERSEDKFRSYARVLTGK  
RDGVEVDNMSMALTCVFSIHVIAQYLRHLLLSAKKTNNIQLLLLITMLLPTFKQFVKS  
10 YEGAKAFLKCVPIGDSVGPMAARLIGDSPVREVEKGTVAEKELEGRLLIVKAHG  
PGGNLGRLLGRAVKLVREYGDVSKIITIDAALKLEGEKTGKVSEGSGVAMGDPGHE  
SYKIEQIAADEGIDLDAVAIKMSATEAVMPMPKSVVDAVEEAERALELAKEAPEDST  
VIIVGVGNTVGIPDNRPYVSNNGGEG

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<SEQ ID No.:0519;PRT;Methanopyrus kandleri>  
LDVRVVLVEPKYDGNIGHVARVMKNFGVKELFLVRPRSELGEVAIARAMHALDLEN  
AVIVNTLEEAIEDVEAAIATTAVLASTPARNPMPWEVREAFSDYEKIAVVFPGPEDR  
GLRTWEVELCDATLHIPTSEEYRSMNLSSHVAVVLYELKKMEYVPERYGRAATKRE  
KEVLVKSLDDLKALNFDSTRRENVCTTFRRFLARARCTDKEIKALLWIFEKAKRRV  
20 LGVKRRN

25

<SEQ ID No.:0520;PRT;Methanopyrus kandleri>  
LLEGMVVNEFRERRNTNYWDGEVEIETEDGKLKLRMPGTIAGWLTKGTRVRVHGAD  
GVQSVDFVKDDVEVERRYEDWVVPVWPPFEMETEVEKRDTLGRGVYEURLRARE  
AIYREDFEAIVGLEQYHYASDKDVAVWGCNECGRSIRANLKPEECPGCGSSRIEL  
RTIRGSLPASRFMVVELLNGEYEPDVLAYVRVDPPIPKLNRRLDGKVERNIREKVF  
GKDWFHPTFEPKRGKTIEDILSACDTKAARIARVVHPEYRADGIGRASVQAAVRW  
VKERRIPEMKSEKHLIEVIAQMARYHPIFESVGFVYLWDTGSGRPYLVRPLSEDAKR  
KVSRIKTDKIARQHGGRLYRSRLRKLEVEPLDGPIKVKRLHKMFSTELDVKGLPKD  
30 VVKLLEAFGLVLRHIQYALQDVNLRIEPGELVVVVGPSGAGKTTLVRMIMGAHEEF  
IENVRRRIIRELSTPVVSRALSSMGTNPKEVADKLKEMYQPDKGKVSPLPENTELSA  
MIPGEVEPEIDPGVTIIEDLWSVTGDVNVAVEILNRSGISDAVLYRSPYERLSPGQKE  
RVRLARMIAEGANLIVVDEFCSHLDPKTAMRVARSFSEMCRELEITALIITHRAEVIDA  
LAPDKLVVVGGLVGVEEKS

35

<SEQ ID No.:0521;PRT;Methanopyrus kandleri>  
VFERIMVPTDGSENAKQAAKAAIEIAKKEDATLIVIHVIPLWSPLGTKPSFTLPEEIVKE  
AEKIVNEIAEMAKEEGIDVETLVVESPSVVQGVIEEAKERDVDLIVMGTRGLSGVKGL  
ILGSTTKGVLSRSPCPVLAIPPEGEGEEGEEG

40

<SEQ ID No.:0522;PRT;Methanopyrus kandleri>  
MARRHFEKLDEKRVREPVGPNKDCEYYPCHFDGQDCTWCFCPLYPCLDEELGEW  
IKTKNGSEVWCKDCHLIHRPEPAKVLLRELLSVGNQSVLRGAERLEEDPELKEKVL  
ESVKRADRKHRQHSSRR

45

<SEQ ID No.:0523;PRT;Methanopyrus kandleri>  
MSVKPKFANLILDGVKNVEVRRWLPGTILRERTCIVYASSPLCAVLGEVTIEEIKKVAI  
QSEEDLAEIAELAKASEDELRRYLEGRDHAYLITLDGPVRYPNPLPLEDLRRLIKERL  
NMDFHPNPLFRVDQEVNLNVRSVAVGVSDRLF

50

<SEQ ID No.:0524;PRT;Methanopyrus kandleri>

- MAEVSFGIELLPDDKPTKIAHLLKVAEDNGFEYAWICDHYNNYSYMGVLTAAVITSKI  
 KLGPITNPYTRHPLITASNIATLDWISGGRAIIGMGPGDKATFDKMGLPFPCKIPIWN  
 PEADEVGPATAIREVKEVIYQYLEGGPVEYEGKYVKTGTADV NARS IQGSDIPFYM  
 GAQGPIMLKTAGEIADGVLVNASNPKDFEVAVPKIEEAGKEAGRSLDEIDVAAYTCF  
 5 SIDKDEDKAIEATKIVVAFIVMGSPDVVLERHGIDTEKAEQIAEAIGKGFDTAIGLVD  
 EDMIEAFSIAGDPDTVVDKIEELLKAGVTQVVVGSPIGPDKEKAIELVGQEVIPHFKE
- <SEQ ID No.:0525;PRT;Methanopyrus kandleri>  
 VRSVSVGEVARRDVITGSPTETAVEIAYKMREHGIGSVVIVNEKDEPIGIITERDLVIK  
 10 VVSQGNPDEVIARDIMSQPVITVEEDMEVNEAVKLMVDKGIRRLPIVDDNGKLIGIV  
 TMQDILQVEPYLVATIEEEMKKFQEELEEELEVSEIIEGVCDLCETYSEELRFVDGWV  
 VCPECYEDILGREIEDRELEE
- <SEQ ID No.:0526;PRT;Methanopyrus kandleri>  
 15 LPDTSVMRLATTNVVSMPTATVKSADVTMIRYGFRRIPVTEPGELELVGIMTGKDV  
 LDYLVGERRKIIERRYGSTFLPALHEPVRSLMRTEVYVITPYDTRKAVRTMFEEV  
 GALPIVKDKKLVGIITERDIMADLYDVLEDTRVEEIMTEDPETVPSDITVLEAAEIMVD  
 REFRRLPVVENGRLCGLVTATDVLHHVSSMATETSPDASVEEVMDVPVEEIMTEDV  
 ITIEPDVNIEEAALTMKGANVGSLLVTEGNDVIGIITERDIMYIAIARM
- <SEQ ID No.:0527;PRT;Methanopyrus kandleri>  
 20 LDRKDVLCALVAFLVGAVVSSPSLDYGWNWFP SGADARGHMTKVWMLEKLWSMG  
 DVPYPKWSEYWYCGYPFLWFYPPPLAYFIPALMTHLAKTDVLTAWKWWTWLAYS LA  
 GPSVYASARLMGASPLGSLIAAVAYQTSYNHIEITFTEGRIPTVAAIVFYALVPGLLVA  
 25 VYRRVWERGRWAGYLALVLSLTILMHSSGLAAITVCLAYVALRISRSWTLWAVGK  
 EELPSILPEVP GHAWVLFAILLSVLAVSWWLM PALEYRTYSYTTKPKWWISMSSVH  
 DPWEFFVPDYWKTRYAKYVGAIQFLLGWAGLILAARRRPRTFLPFAIMTGVALLLSF  
 GLVLQKPMERIGFEPKWFLMFSAVILCTFVAFVVDNFRFLRRHTVLMICSM MVVDA  
 AIGLKYAYRPVHYTVSELSALLWMREHTGPWDRVATVGYRALWGM EPYITGAPSV  
 30 FGWYREGTPIRDVVVQYQRSFKRVEPNKALKIGDVLGVRFLILSSRKPYAKRMITEL  
 ERVGVRPIRDYRWVKVYEFNPTMGYEIDDIKS VFLGNKYRYMRLCKLLRYDPKYAP  
 AYAFTRI PDCLVRYAHPQVVMDRHPSP EEVRLKEFGVKEILVLD RYHKFKTKIF  
 GINIVHDRPLRIVKMLPKRNLKPIRVDLGHAWFKVYGRGWVWVKVPYFPCWIPDRG  
 VRLGGIDNMILLRVPSPTTVKFVWNPHPLWIALSAFSLCVSLYLTFSRQWRT
- <SEQ ID No.:0528;PRT;Methanopyrus kandleri>  
 35 VADPSKDVKKLSMILESEEWVRVEKAIERGTIRRVRTSFP GFVYYRTVREFAGFERGT  
 LIVPSHGLLLRGFPKIERALLLEPALRSRFG EVGKVIVEEKMNGHNVRVFELDGEVYA  
 ATRGG LICPYTTHKLRNMFED ELKQFFEDYPGT VVCGEFVGKENPYVSREYPEAR D  
 40 VGFFVFDVRDP SGRFWSYEEKLVDEYGLERVRCFGEFEVSEVEEIH RIVRELDRE  
 GREGIVIKDPDRKLPLKYTTTHSAHVEEIEWAFRFAFDLGRDFVLTRTIREGFQSFE  
 WCEKDRELKRRGAEIGRAIVEGLRRAVEQVVEEGEAYEEIPLTFESREWFERYEDF  
 VKRVTGGTHSLKIIEEKEDGTVRAVL RKRYFGTGDKVSRILEEGVL
- <SEQ ID No.:0529;PRT;Methanopyrus kandleri>  
 45 LIEVEIPGRGELRLEHLVLDYNGTIASGGKLLSVVEPLQELTEIVHVVASADTYGT V  
 EDELNDAGLDIEVYRV SAGNEREDKAELIEELGPEVCAAVGNGANDELMLRRAALGI  
 CVIGPEGACSR TLLNAHV VVREP REALELLLD PKALRATMRC
- <SEQ ID No.:0530;PRT;Methanopyrus kandleri>  
 50 VLALRVLLKGKILIGGRVREVEAEDGWIVKIGKRLNEEADLTLELGKRELAVPAPID  
 LHVHCRDPHPDYPFGFKTETRRFLLGGVATVVDMPNTRPAPTTPETYYEKEELARE



- 5 NAEIEVIVAGGVRDSQCTKELVEAGAYVLGEVFLATSTDAPAVPWSTLPEIFRELS  
 DGPLTIFHPELDELVAERPARNLYEHLKNRPPEAETTAVGLLAGLKVRYP  
 TLPESVKIAKGADITVDVTPHHLFFDVLVDPEDPVFKVNPPLRGRHRLG  
 RGDVDVLASDHAPHILEDEFEDVPSGVTGGEIILPAALT  
 5 PAKLLGRDDLGEVAVGKRARITVVRMREFVVRAEFGEEDRKFPYDGM  
 RMFGPEV  
 KLIDGTKVYDLKESRREGKPVILEGE
- <SEQ ID No.:0531;PRT;Methanopyrus kandleri>  
 10 VSELPTGARVLVECLKEEGVEHIFGYPPGGA  
 VLPYDEIYDEV  
 SIEHILVRHEQGAAHA  
 ADGYARVKGKPGVCMATSGPGATNLVTGIATAYMDSSPVIAITGQVPTT  
 MIGKDAF  
 QEVDAVGVFMPITKHNYQIGKPEEIPV  
 KEAFKIAITGRPGPVHIDVPKDVQEA  
 EVD  
 VEIPKTVEVEGLNVVKRGHPVQIKRAA  
 ELLAEAPERPVILAGGGCGVISNATRE  
 LIELAEL  
 LGAPVATTLMGKGAFPEDHPLALGMAGM  
 HGTKAANYALTECDVLLAVGCRFS  
 DRT  
 15 TGDPSGFAPEAKIIHIDIDPAEIGKNIP  
 VDVPVIGDAKLVLRLDIKELKRRKYL  
 RERKRW  
 GERIEELKAEVEMPPESTESDQRISPRE  
 LVRLHEALKDRDYILTTDVGQNQM  
 WMA  
 RYFPVEEPRRFISSGGLGTMGFGLPAAL  
 GAKVAAPEKTVVAVVGDDGGFLMTA  
 QELA  
 TAVDNDIEVKVFVMDNRLLGMVAQWQ  
 RLFYDERLSESKLDEKTDIVKLTESY  
 GAAGI  
 TVEEPSELESAVEEAFETPGTVVVDV  
 FVDPEEIIPMVPPGGELRDILGEK
- 20 <SEQ ID No.:0532;PRT;Methanopyrus kandleri>  
 MDFEELYEKWFKGETTEVGIYMAMAIVAREQGYPEVCDLLEQIAMDEARHAAAA  
 LI  
 AGKVENSLIEGLIEKMEEMIEGEKNAYETRMDEADHHSDELDDDEITLLKATAY  
 DEKH  
 HRKMLKAALEKLKE
- 25 <SEQ ID No.:0533;PRT;Methanopyrus kandleri>  
 LRYVDAHVHLDVRSYEDLERMALSGVRTVVTCAHDPYPDMTAEVYSALFRRL  
 LGVE  
 TWRGEKAGLTVKVAVGVHPGGVPDNMSDVLREVEELLSHEDVVAIGETGLNEN  
 PD  
 DREIQVLEAQLKLAREHEVPIIVHTPSRNKVEITEKVLILNSSGIDPSLVLDH  
 ASAET  
 30 VSLIGEEGYAVGLTLRPGELDVWEACDIVEEYADEMTLIASSDLGSLAADPLAL  
 PKLA  
 LELERRNVEKSIIRDVVARNAERFYGL
- <SEQ ID No.:0534;PRT;Methanopyrus kandleri>  
 35 LRTNVYPRGCEDR  
 LRFALYSHQFGKRMVANLLNEPGHCRACGPVCDGCKYDMY  
 SLVDSLVAVEELPKPEELPPFVDEPEDHLP  
 ELPPVDVLVAIGLHPDLLVALSEVYEIK  
 ALIVPVEEPDWIDPWIEEKLREVCEENSV  
 ELTVARPGCDLEPSGPVTEAFCDAGMIG  
 RPKLFMKVEDGVVIDVHVRSAPCGCTW  
 FVAKRLVGVADAPPEEVKATVSEAHHSY  
 PCTASMEVDKHVGD  
 TLLHVAGRLHIEAALRALEEATDTDA
- 40 <SEQ ID No.:0535;PRT;Methanopyrus kandleri>  
 LHARCRCHTVKPTGANLRPLMKYIVAFRPGVDKRS  
 LFRAVYLLDKAFERETGRPLT  
 GTEYGHCMLLKAPYFSVDVKEAIFDLLRRGE  
 IELRPERRNGELVSTYYPVGYRAEDI  
 EDDVRREYSLHGDKWRLFREVLERV  
 LGGA
- 45 <SEQ ID No.:0536;PRT;Methanopyrus kandleri>  
 VEEKRSSCPYADEAVCELVEHAKELNEE  
 IPEIETPHIRWPVQFPKCPYKQG  
 VWCNI  
 CSNGPCRITKTPRGVCGATADVIVARNFL  
 RHVAAGAACYVHCLENAARALKSVAD  
 EESPYEIADEKALRHAAEVYGLDTS  
 GPKEDVAAEEIAEFILEDIYRPRYEESE  
 VFKA  
 V  
 PDWRIEMYEEMGLIPGGAKSEIH  
 DALVKTSTNLNSDPVDMLLHVLRLGLIT  
 GPVALF  
 50 GVETINDILFGSPKITQTEGGP  
 GILDPDYVNIMTTGHQMALMKYLTDA  
 AEKLEEEAKA  
 AGAKGIRIIGATCVGDDFEARAEHL  
 PDTYAGFAGNNFATEALAATGLVDAI  
 VSEFNCT  
 FPGLKFYKEKLDVELVAVDDVAKVW  
 GAELILWDPERAEVAAEEAVQRAIEA  
 FKERR  
 SKHEDKIMEPKHRHENVVVGFGYFS  
 IEAVGWENVLKLIEEGTIRGVCAIMGCT  
 NLSS

GGHNVPARELAKEMIKRDVLVLGAGCVNGAFANAGLFNPEAAELAGDNLQRQVCEE  
LGIPPVLYHYGPCLAIGKIEHLVFEIAEILREKTGEEIDIPDVPASAPQWLEEQALADA  
SSALALGITLHVSPVPPVTGSELVTKTLLEDLPDLTGSELIVETDMKRAGEILAEKIEE  
KRKRLGI

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<SEQ ID No.:0537;PRT;Methanopyrus kandleri>  
MVVTMEIEAIRVATGAPGELYMVAEIAEDKVVNAEVCSGTTPISWETLVLEKPVFEFA  
VVAAERVCAASCDASLGLAVVEAAEAALNVEIPDEAERAREILNMANVVRAHATVLRAR  
TDFLDVKKPAYDLVRAAKDIMHAVGGKPDHPPAVTVGGDLLEKLPVDRVESVAKDA  
10 AEVADRLEDEVGSAVDRMKEDIDVEPEEMPAGLKVSDTYKGDIDPDKVETLMPDEF  
YRMKTTLEIANNVVARYDGEPVLVGPYARVRSANPLDLYTARAEVARMMLDGIAN  
AVSRLDPTGNFRDVELGSGEGTAAVEAPEGLIVSLRLRAGRVDKALMLTPCNFK  
VAAIGEMVRDLTVDRATVLRAGLSGRCLTH

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<SEQ ID No.:0538;PRT;Methanopyrus kandleri>  
MKVAVLSLMACGTCARNLEEVCHEEGHEVVWSNLEGDEGEPPADILFVEGAVDFA  
DAETLEKLEEAASAVSTVSLGSCAATGGFERHVIGMRDPDRYHFTVFPAAKFVET  
DYAINGCPPTTDVIASFLRALEENEDLRPYEVLSGDFHGLTPELSAPVTGPTVPV  
EDVLLTSNKDLCGLCDLDVIEKDLFCVGCCTCAASCPAWAIEMDEKPVIRQERCVR  
20 CGTCFVSCPRSFRI

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<SEQ ID No.:0539;PRT;Methanopyrus kandleri>  
VGEYREVYLTRATDERIREHGQDGGTTTALLAHAEEDTVEAVIASSTVETWKPEPV  
IVTDPDELIETAGSKYAI SPNV SALNEAIA SYDSVALVGT PCQITAVKKSKMYPYGLAN  
VTERVKLTVGIFCTENFQYESLLKLLDMGVDVENVERMDISHGEFIVRTKNGDVHS  
VSVSKLGDYANEACNYCTDFTAEDADISVGSVGAPDGWNVVLVRTKEGEKVFRSA  
VDADVLEVKDIGEGDPNLLERLARDKKERIHTSMCATWRPYHPTVPL

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<SEQ ID No.:0540;PRT;Methanopyrus kandleri>  
VIKPRDFLRYFLYSYIVTSAQLLGDKAPTLLRMVCKNVVKALLREHPELKDAEPVELV  
KDVAESFLGADVRIEEKSTETVVHVRGCKICPRDLIEEFTGENPDLEGPVFSYNVCA  
FVTMVEEILHALGHIDSDIKHDPKRGRCRVVRPKGTD

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<SEQ ID No.:0541;PRT;Methanopyrus kandleri>  
LTVPTFLRKVTLREICVIEEYVDVQYRAIEALMDTLPSTDLVRLTVANALVSYQLSSS  
GEDWWREFSSYFRERRPRDIVREYARFLPRSRGNRRLIRQKLRLHRAKAFLEELS  
WQDAKSYYRDMNRLRLDLARVLNADPESKTIVFTVKMFGYALRAITGRFRPYPFEIP  
IPVDARIERITRRITNDPQLYWDSIARRTGIPPLHLDLSILWVGTSRDPEVKRLLAKVL  
PKLIGELEMLGN

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<SEQ ID No.:0542;PRT;Methanopyrus kandleri>  
MKLVIDVPKEIAKALDSKTRREILKLEERGSMTISDIARELNLSKSTVHHHLQELRKA  
GLVDVIKEDRETPLPKRYGLVRRLVRVSKPKLEDASEYVIKALERGEDLRTSMFLAI  
AAAYRAVLES LGIDASEVLYELGKEIGKRLAELGSEETVLRKGLEIIAESVEFRQEND  
45 RVVVEIEGCHESDLPYGPACHLEAGIIAGVLSNLRERPYEVREVECCGEGADRCV  
FVAEPATDEERPKS

50

<SEQ ID No.:0543;PRT;Methanopyrus kandleri>  
LSRKPGEPAKEEDEKGLIAVKYAEEMLGDEYAEVVEELHRIIWKESPLDDKTKHLIAL  
ALAAAAGDERRVGLIAETAKNVAEVTDEEIAATLALVAWVEGVSKVTRTWGVLRQ

<SEQ ID No.:0544;PRT;Methanopyrus kandleri>

VRLLFIADEMSFEARQKTKIAEEEEPIKEAEVEDCLVVFAAVQEADEENPKAIAEAA  
VEEIEDVAGELKADRIVLYPYAHLADDLASPDVAVEVLKRMEGLLKERGYEVVRAPF  
GWYKAFLACKGHPLSELSRTVTPEAAAAEEEEKIESEFLVYMDGELIPVEEVDLSE  
LPEDFRHLVMHELGEERETGDEEPAHVKLMREKEICDHEPAADVGHVRWYPKGVH  
5 VRRCLA EYVENLMADLGA AVVETPVMYDLSEDAIREHADKFGERQYRIRAGNRALM  
LRYAACFGAFRLADTTLSRRHLPLKIYELSQSFRLEQSGEVVGLKRLRAFTMPDLH  
TVCADMDEAVEEFLEQAKLCLEVGLDLGLEYEYVFRTEKFLKERKEVLEELAEAME  
KAYGDAKPVLVEVLPERKHYWECKVDFAFIDSLGRPIENPTVQIDVESGRRFGITYA  
DESGDERHPVILHCSPTGSLERVICAILEGQYKRFEQEGKLPTLPTWLSVPVQARVIP  
10 VSEKVL EEA EKVFEE LKSEGFRVDLDDRDEPVG RKIRDAGEEWVPYVIVIGEEEVKK  
GTL SVTIREESTLKEQRREEMTLEELVERLERETEGKPRVPLTIPDRLSRRPRFGR

<SEQ ID No.:0545;PRT;Methanopyrus kandleri>  
LLVKG GCELSKRRVLSVLVKDRPGVMQRVSGLFRRRGFNIDSIAEGP SEREGLARM  
15 TLTVKGNEQTIEQVVKQLNKLVDVIKVELDPERTVERQLALVKIRTKDRARAELAR  
AAGAEVVDVGRETITVEIVGEPQDVESLLELMKDIGNIVEIARTGIVAMERET

<SEQ ID No.:0546;PRT;Methanopyrus kandleri>  
LKKPVD AHC HLCFKYFKGEEDEVVERS RKKVLRVYDCGATPGTARRTLELAERFEG  
20 FVFSTIGLHPPRAPRMQQSVIDDVRIIREHADRIA AIGEIGLDYHYVKEPGERRRMR  
EVFERFLKLAEELDKPVVIHARDAEEH ALEVLEDYDVVAMFHCYDGP AELARRIADA  
GHYVSLSTIHVIRGPKDERTRELLETVPLEAALTETDSPYLSPV RGERNEPRNVWRV  
IELLARVKGV PVGEVVETTARNALEFYDL

<SEQ ID No.:0547;PRT;Methanopyrus kandleri>  
LRKTNLAALVSAVALLGALVLA FAGGPRWPVGV LALIVGGLDVMISFRRGGDRVLGL  
25 MGFLLLMVGI AVL TGRVR

<SEQ ID No.:0548;PRT;Methanopyrus kandleri>  
30 LKLCLVAFDGRIPMLSSIVDRFEEHVSEYLGEVKVKKKRAKLPEHAYSKVRGQYLAR  
ALLDTLRGMKGEYDRVLGLTSEDLYAPGLNFVFGQARCPGREAVVSVARLLDPDPE  
LYLERVVKELTHELGHTFGLGHCPDRNCVMSFSSSLLEVDRKSPNFCRRCTELLQR  
NLKRGG

<SEQ ID No.:0549;PRT;Methanopyrus kandleri>  
35 MYRITSKKLETRRLNGAVVTIEYVDKVGRRVVRRAKRSDIPEVVEIEERAFPKSPY  
PTYVFLYNLSNNPEGFLVAEVGGKVVG YVIFELRPWLGE GHIVSIAVHPNYRRTGIG  
TILMGEAERKIAEAGYETVRLEVRESNFPARRFYERLGYREERREHGYYSDGETAI  
MVKKLKSPIQYRQ

<SEQ ID No.:0550;PRT;Methanopyrus kandleri>  
40 VNAKGPLTRSTPSPVCGGTSRLWWREYVKEIQRKAETGEYAVRGFGTSRKVPHFD  
DLVILPAQVSRPPIDKYREPCNTKTVLGDRFAEKPLKLDTPVLVGAMSGALSKEAK  
VAIARGTAMVGTATNTGEGGMLPEEREEAKWLIAQYASGRFGVSAEYLN AADAIEIK  
45 IGQGA KPGMGHLMGEKVTKEIAEIRGIPKGS DALSPARHMDIVGPEDLKM KIEQLR  
EITDWKIPIIVKYSPGRVKEDVKIAAKAGADIIAIDGMQGGTGASPEIATENAGIPTIAAL  
VQAVEALNEIGMRDEVDIIISGGIRDGADVAKALALGADAVYVCTSVLIAMGCTACAQ  
CHSGRCPVGICTQDPELRKKLDVDEAAERVANYLKVVTEECKMLAQLAGKTDVHNL  
EKEDLRALSEDVARITGVKMAGSDVELA

50 <SEQ ID No.:0551;PRT;Methanopyrus kandleri>

LILIIDNHGQYVHLIRKNFDYMGVPAEIIIPNTTDPEDVRERASGVVISGGPSRERAGN  
SREIIIEELTGEVPILGICLGHQLMAEVFGGKVDWAAGREEYARTEVEILDHEGIFEG  
PDKIVAWASHRDEVKEVPDEFVVTARSDRCEVEAMRHEELPLYGVQFHPCLKFTEY  
GPDILKNFAKLCGEL

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<SEQ ID No.:0552;PRT;Methanopyrus kandleri>  
MWRTVKMGGSTTKFGFFTLVGYTALLSLGAIVARLSEDRGLPDIPFLLLLGFLLGPI  
AGIVRPEYAQKAFPFVGTGLIILLDGGFEIGIDVLRVAVSLVAKLDSITLLITAGISSLI  
FNLVFGKLPFSPIGFLYGSITCATDPATLIPVFSKVLPINISTALIAESVFNPLGVVLT  
KMSLSVMGLSSHQNPILLFISLAAGGAALGLATGVVLERLLAREPFGEYVVPITLGAA  
LALWYICEELLPGLLGYELSGFMAVAVLGMVYLGNNLIKHDYKDDRTFLKDFFEELS  
TVVRIMVFTLLGACVSISLLKTFWLKGLVCALSNVFIARPAGVIIGTYIPPKEDLNLKER  
IYLALEGPRGVPAALVGTIYSKIVSNPHAVPVAIASEMPPKTLASAILVTTFLTIFISV  
LEATWAQPLAKRLLKEE

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<SEQ ID No.:0553;PRT;Methanopyrus kandleri>  
LPVEKHVERAPKRLAIAVITVSTSKFEEAARGEEDTSGDILES RF EQAGHETRYR  
VLIPDQREM VAGAVKWTANRVDVTTGGTGLTPTDVTIEAVGEIAEKQVPGFGEL  
FRRKSEEDVGAHSILSRAEMFVVDGTPVACLPGSPNAV KLGAE LLIEVLPHVVVHSR  
GDV

20

<SEQ ID No.:0554;PRT;Methanopyrus kandleri>  
VTAGGRMSMVDVTGKKEEIRIAEASGFLRLTEDGVNAVKSGESHPPQGKDPIEVA  
KVAAILAVKKTPELVPHCHPIKITGVDVDVEVLEDGVKMSVRVKSEGKTGVEMDALT  
GLVVGLVTLWDMVKYAEKDEEGQYPHTRIENVRVVEKIIKEKE

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<SEQ ID No.:0555;PRT;Methanopyrus kandleri>  
MTFLTAGTRLVSLDYIAGFFDGEESVVVRFVRDGRYRAGYRVSTKVVFVQKERDVL  
EEIHETLGMGHLYRRGSDGVWYLEIYRREDLREFVELIGNRTMVKRDALERLATVLE  
LLEGGVHGSRDGLERIREVWEG

30

<SEQ ID No.:0556;PRT;Methanopyrus kandleri>  
LTDRIETRIPGFDEMIGGGLPRRGVTVLAGLPGSARQPLLDNAVWNVLEDGFRVLLL  
ATSTSPYEFLRRSEEDRRAREAYEKGDVLVNAFVSVRAGIYHRTVGEIIQDLEPHRI  
RELVPEDPDVVVIDSIYPMHRGEHEKFLQVISTLKVAVRNDLAVLAGCALPESAL  
RSPNAEVADVLLLETAVHEFRGALVYSLLPIRTLPHLPKYRAPVSILDDGTVVVHCDK  
VLDVKAGEIRDVDEYLNVDVLMPEMAREVAEDSEVLGELEEEERDDIEKLLEEELEEM  
EG

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<SEQ ID No.:0557;PRT;Methanopyrus kandleri>  
LNTLERVLTFLQDLRSHLDGTGDMPEPRTLAEFALQRLTPMDLDICINIVETELVWE  
ESGLHVRPALHPYVSERIGVYTLDDDEEVGRFLGYPECCVEYFLEGHVRFDHDPDNV  
VVTEGFVPCSPTCRRHRVHLLFADPEPYRRLEGRRLRTRLEKLGVL SYHSAYR  
GFYEVHVPKFEGVHLDRPY

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<SEQ ID No.:0558;PRT;Methanopyrus kandleri>  
LVRVRSVSRIHVTIDLHGGLGRVDGSGVGTLEGPRIELEVEPTGEGVKVDGEGEIA  
EKAERAARKVLDLYGIEGGVRIEVRRYPEHVGLSGTQATLSAAVGTLEAHGVEH  
YDVRELADALGRGGTSGIGVAAFERRGGFIVDGGHVFGPGGKEEFKPSAASGEVPP  
APVISRLEVPEDWRFVLAIVEVERGAHGDKEVNIFKRYCPVPAREVGEICRWILMVM  
MPAVVEDDPEDFGRAVDALQDLGFKRVEVGLQHPVVRMMMEVARSA GAYGAGLS  
SFGPTVYAVCDSPSARDVAQELEMYMREEGIGGEVSVSEPRNEGFEVTG

45

50

<SEQ ID No.:0559;PRT;Methanopyrus kandleri>

5 LGVYVAENFTGVYAFDEEGNLIDHEPFPKDPDEIVERLLKRERGEVLEEEEEALLSRL  
DADVINFEGTKADRERLEEVDGELVVEFPNVAGEVLRERARELAVEGVVDSEEE  
YSELVYEVGMKLSKEKVRATVEERDQMIIQAINITDDIDRILNILTDRVREWYGIHFPEI  
NKIVKKHDDFVTLVAELGHRKNFTYDNIKEVLPEFPDHLAEKLEEAAKDSMGAEMDE  
KDLAAVQRIAEVARELYEIRRKTADYIDESMDDVAPNVKALVGPLIGARLIALAGGLK  
EMAKLPASTIQLLGAEKALFRHLTKGTPPKHGVIFQHPLIHRSPWWQRGKIARALA  
10 GKLAIAARIDAYSGEYRGDELRRQLEQRVKEIKEKYPKPPKRKRGRPPRGRRRPRR  
RRSPRRSRRDRRRRSRRRR

<SEQ ID No.:0560;PRT;Methanopyrus kandleri>

15 MVEIEIEPHEEFEGVYWAIFEDGRKKPATENLVPGHQVYGERLVEYDGKEYRWWE  
RRSKLAAMIMNGMEYFPFEEGSKVLYLGAAAGTTPSHVSDIIESGVEYCVFASR  
MMQELIPVCEKRPNMIPILGDATKPHGYAPLVEQVDVIYQDIAQPKQAEVVADNAEA  
FLRPGGYVIVAIAKARSIDVTKEPEEVFEDEERKLEERGFEVLEVIDLEPYERDHSV  
EYHG

<SEQ ID No.:0561;PRT;Methanopyrus kandleri>

20 VNVLEVLVVVPSLYMGWTIGADDAGAAMGSAVGAGVRTMRQAVTLIAVFTTMGA  
VLEGHKVVKTLGKGVVQAHLDPAAAGATVLVAAAWYHLAVMLGVPVSTTQATVGS  
AGVGCALGLPVNWSKFGQIAVGWFLSPILAMIPAYFVSRRRLRAVLEKKGWPLAEIER  
KIGWLLTISGCYVAYTIGANNAANAVAPIVMTGLLDVRSAAIVGGIMIAVGALTAGSKV  
IETVGRKITRLDPVTAFAELSAIVTHGASELGIPISINETTAGAVIGVGLSRGELNTH  
25 TLKKIFTTWIASPVGSFVMSYALMRLYLSVRGAAPV

<SEQ ID No.:0562;PRT;Methanopyrus kandleri>

30 LILRPSTRPAERALDALLEELDTMIEACDLLSDVTTMEESPKEVEERQESLSEEVAEL  
KDRVDEAMESSSMIPVVKEELGYIAENVRRAAETLLSLASLLVSFYEDLEEDREKL  
DEVIEGIAKIASGVRESVELLNEVDVRKAAEHVEKIRDQEEDVRSRLRTLMLKTERN  
RLAPIVLEIERALEDMDRALDGVNRIKVRFLG

<SEQ ID No.:0563;PRT;Methanopyrus kandleri>

35 VRPVEVLGKRWAHPIACASGALAAHRPGMENAVLRGAAAIFTKTVTESPREGHPGP  
VFVDYLDEGYALNAMGLPNPGPDRMVVEIEEFDEFDVPVYASVAADGPEGFKRL  
ARAFSGVADGLELNVSCPHAGKGYGAELGSDPEAVAEITEAAVRAFDGPVSVKLTP  
NVDRETLLEVAAAIDAGAEALTAVNTLGPGLRIDLRTASPVLGAGVGGLSGPALKPI  
ALRVVADLALEFGEEVEIIGVGGIRNGEDVVEFLFAGAKAVQVATAAREKDFGDIAM  
ETSHILKELGYDGPPEEAIGAALPEYRERLRRLGWCQ  
40

<SEQ ID No.:0564;PRT;Methanopyrus kandleri>

VVSVKPIPAEVVENREECERTIVLRRLRPERPIRWEPGQFLMLGISGVDEKPMASFSGG  
DDREFELTIEIVGPFTERCADLEPGDVVWVRGPYKPFVVRGSRVAVVAGGTGVAP  
LVPLVERLRRARVHVTSLVGGPHADRLPRKDDLEKLSDELYVTTEDEGSEGRKGFT  
45 DVLEELVEKECPDVVYACGPEGMLVRVAEIAAREHDVPCQVSVVRYVKCGEGICGS  
CALGKGLLVCRDGPVFWTEEELEGTEFGGVRRDVTGKPE

<SEQ ID No.:0565;PRT;Methanopyrus kandleri>

50 VTSRESLSDAFVLPANHNEEGAVGKVREIRRMYPDALIIVVDNASSDRTAEEAEKA  
GALVVREPVKGLGKAIKAGIQCALEHGARIILRTDSDGEFDPNCFALIEAADDYDLVI  
GNRFSEGRPENVPPLSHYLFNMILITLFWLFYKILDVTCGCRVFSRELAREILKRDVD

DGPAFDADTTSLAVSLGYSVKSDVRLRGRISGQRKVAPTVIGKVLVGLRILFRVAV  
NRLRWRCEPSTLSRGQ

<SEQ ID No.:0566;PRT;Methanopyrus kandleri>  
5 LGLAELRELIEPEETDLRALAGREIAIDAFNALYQFLTITMKDGRPLMDSRGRITSHLN  
GLLYRTVNLVEEGIKPVYVFDGEPPDLKRETLERRRERKEEAMEKLRRAKTKEERE  
KYARQVARLDESLEDKRLLDLMGIPWVQAPSEGEAQCAVMARCGDVWATGSQ  
DYDSLLFGSPRLVRNITIVGKRKHPHTGEIIEVKPEIMRLEDVLDQLGLESREQLVDL  
10 AILLGTDYNPDGVPGIGPKRALQLIRKYGSLDELKDTDIWPKIERHLPVEPEKLRRFL  
EPEVTDDYELDWDEPDEEGLVEFLVEERDFSEDRVRRRAVERLKEALQELRKGGGRQ  
ETLDAFF

<SEQ ID No.:0567;PRT;Methanopyrus kandleri>  
15 LIAEVAEFVLEALLVIGVSVFGLHLLGALASEKIRCRAVPLVVVGLIHPHAALTAREM  
GLKGRELLIAKVSFNSATYTATACVNALTLLGSTVGGPYALTALVDATEIVGGLLL  
RRVRAQLPTHGSLRDALNEATRTVGRIAYLVPGALLGIISSYLRLGGYVPMFTL  
ANPVAGCAAVGTMLRSGVLDYAHAYSLAVTGAALAYVGRLLRSCGPVTVAITGLRS  
GSLLSTVNLLADIGLLLVMVIGYLTFGPPGVPPLGVLGGF

<SEQ ID No.:0568;PRT;Methanopyrus kandleri>  
20 LGSLETEPVSLSLKRPFRISGREVRRVRGYWCTCVIEGNSGRGFGLRRGIAEEMAT  
LDAVARRYDEPLCRVWGREPASIESFATVDLVGAEEQAELARRYLRGYRKLKVKV  
GGDDLKRDLERVEACVKSAEFDALILDGNEGLTVEEVFRLLDFDGDVYLEHPTP  
PDSLEEVCESEAPVIVDVMDLGARSIDVDVAEPCDIVNIKTQEVGFVGGRLRLAR  
25 DAREEGFKVMVGCIVESFSSISAAAHAAVEADLCDLGDHFLDEDVVSNGPYAP  
VMVTEGPGWEVRVERPKPA

<SEQ ID No.:0569;PRT;Methanopyrus kandleri>  
30 LELPHKPGTPAILCHGAFDEPHGKTAHGLLRFGRIYDIVAVIDRELAGKTAQDVDPD  
FPPVPILRSVSEALEELDPEVLLIGAAPPGGKLTPEWKEEIIEAVQAGLDVVSGLHEF  
LSKDPDISEAAEESGSRIDVRKPRKELFRVADGSARDVDATVVLTAGTDCAVGKM  
SAAIELVERLREEGVAAFLATGQTSIMIGAEDGVVDRMPGDFMAGAIEELVRLA  
EDHEIVVVEGQGALSHPAYSGVTAILHGAWPDVAVLVHDPVREVVRDGFPRFRVPD  
35 PRTEVTLIESLSAAEIVSVLRTWDERLAEKLSSEGYLVERLGDRLRRTVDRVLEIHRM  
GR

<SEQ ID No.:0570;PRT;Methanopyrus kandleri>  
40 MRIRPDSTAEDILPLAMAVHELVNRLPVTMRTRDNPGVRIEDGEVIDDEYTGPVLEE  
VLEKGEVIRKVPESGPYEGTPVWVPIKDEGETIAALGVVDLTGYIYSSLRKVTQRPI  
R

<SEQ ID No.:0571;PRT;Methanopyrus kandleri>  
45 LKPKCYRCPSPGDTCDRCGLADGDQMERTVESYRRDELFRSASEIEVEGYMEWT  
RVEEIAELCERMVWKSVAFCVGLAEEARALCEFLEGRGLEVYSVCKVGGVVK  
SKLSLLELKPDKVCNPRQLQARLLNEIGTDNLVVLVGLCVGHDIIFIEESEAPVTVAVVK  
DRRLAHCPALALTNRYYRRKLGLE

<SEQ ID No.:0572;PRT;Methanopyrus kandleri>  
50 LAKKLCFFLGCIMPNNRYPGIEKATRLVFEELGYELVMDMGASCCPAPGVFGSFDLKT  
WVTIAARNLSIAEEKGYDILTVCNCGCFGSLNEANHLLQENPELREFVNEKLAEIDREY  
KGKVKVYHVNTFLYEEVGKIKKEKVERPLEKTDGEPLKVAHVHYGCHLLKPSEVTGF  
PGSVEDPRTLDELVEALGAESVDYKDKIMCCGAGGGVRSRELKVS LHFTREKIFNM



LEAGADCTTNVCPFCHLQFDRGQIEMKEHFEKLPPKKLPVFHYCQLAGLAFGMDPE  
ELALETHEIDCTPVLEKLGLA

<SEQ ID No.:0573;PRT;Methanopyrus kandleri>

5 LVEPRDTVIREEDLNPDFLEELSELVEPVFEEEEVLSVQACYQCGTCTGSCPSGRR  
TSYRTRLIMRKLQLGLVDEVIKSDELWMCTTCYTCYERCPRGVKIVDAVKAARNLAA  
KKGYMAKAHRMVAMFVIKTGHAVPINDEIREVRKNIGLDEVPTTHRYEEALEEVQK  
LVKINEFDKLGIDWEEGDLVD

<SEQ ID No.:0574;PRT;Methanopyrus kandleri>

10 VRLDVDVAIRVNGVLLTPEELELLKLSEHGSMKVAEEKGVTRSAVHKRIRNLEER  
LGCRLEVSSPLGSYLTEHGRRIVIKYVNAKARLSRTETTVACSETVIEDVLAALGREH  
DVDVIVPPHEKMRRVEADVVPDDPVIVFDRSDEAVGEPVVRRLVVRVGDGSG  
15 FVEVPGSAQRIYLTDLRNREEIRPKMRVSYASALEAVRDGGMWTVVPEELAPEGD  
DPGPHYTMALPLTRDGEDLLDVLEG

<SEQ ID No.:0575;PRT;Methanopyrus kandleri>

20 MPICVEEPERIREAAESLMETLDDLVPVAMKLYLSEGDVPDDYERVGEECRHCEF  
VMTVARGEMDNİYATPEEQACKGGSAAIGLDDIPDPVRTGKFYYEGLGQHATLSAS  
KRTVELVPKAFDGEVFEAITYEKATGVEVVPDVLVCKPKEAMKIAQAYLYPEGG  
RVYSDFSGIQSLCGDGVGKIMKEGGINFTLGNGSRAYAKVPDECLIVAMSTKAFVV  
VGHSVTEIP

<SEQ ID No.:0576;PRT;Methanopyrus kandleri>

25 LRPFLRPVIVELVQGTAEALRPVRLSCVFGIKEDEAEYLKLLENSEEAPFTVEDVAEI  
INRSRSTAQKMLQSLVRVGMVERERETLPGGGRRYLYRPAPWEKVKELGLENLRIV  
CEEIERWFREFTPH

<SEQ ID No.:0577;PRT;Methanopyrus kandleri>

30 MSEERRPFAEKVETRDGEILLRCPRCDALFRDQKSYSRNVNKSHLYKKNRPKRIL  
KKMKRRGDVLVQD

<SEQ ID No.:0578;PRT;Methanopyrus kandleri>

35 VGKRVLAGGVFDILHPGHVAFLEEARKIAGKNGELVWVARDETVRRLKRTPIVPEE  
QRVRMVSALKPVDRAILGHPRDFSITLTKVPDVLGPDQDIDEKEVERWAERAG  
VDCEVRRIEKYERCPLDSTIKIVKRVIELWKRGEELRV

<SEQ ID No.:0579;PRT;Methanopyrus kandleri>

40 VLVLARVFIHPPNSLILHDLVERFGHEPLSLPKEISKVRVDPEIDSPPMNVTPQDAKR  
GLKYAAVEVPSGVRGRLALIGPLIEKADAAIVVTGIEDFSFGCLGCDRTNEFVTYLVR  
RQGIPVLELEYPKSEEEAKAFVREIRDFLES

<SEQ ID No.:0580;PRT;Methanopyrus kandleri>

45 LAVQIAQLSCGTEYSGVQPEIERAAERVGAEIVLPEVDIDIVEEACEEVGYTPKSANL  
KVLLARAYALANGYAEADAAIILTCFRCAEGALVRSEARRYLQENTDLPVVTYSFTE  
DLDASELLTRMEALVTIVERKGLLARKRQEGTLTGIDSGSTTTKAVVMEDDEVIGTG  
WVRTTKVVESAEKAVERALEEAGYELDDIEAIGVTGYGRYTLGRHFDADLVQEELT  
VNSKGTYYLGDKEGGATVIDVGGMDNKAITVWDGIPDNFTMGGVCAGASGRFLE  
VAADRIGVDLDKFGKLALEGDPEAVRLDSYCVFGIQDLVTALAEGADPEDAAAAAC  
50 RSVAEQIYEQLQEIREDIREPVFFVGGTSLVDGMVKALEDVIGVEVVVPEYPQYIGAV  
GAALLASNYV

- <SEQ ID No.:0581;PRT;Methanopyrus kandleri>  
VYEHKGKRLVRASEKEAAELYDITRHAATDLGLARTITA AVFHLDIEAPLYAAAVRT  
RPMLRPVTLGKVSHLELDDEEGLTKVSVAVERYFPDVIRTLQSVFGEDRVRHEERL  
EITIEPPEGMSPEHLEKLEELVHDPKKLAHRVYDFIERVRPEGFRVARYARFDQD  
5 FLYLASEGTLEDEWTDLLFELPGELDRVGERRGPSE
- <SEQ ID No.:0582;PRT;Methanopyrus kandleri>  
VRGPCNDHPCYVGEHGKFKVHLPVGGRCNIHCRFCESGLEHEGVRVDYPGRA  
VRTITGDEARTALKRVKEHCGRVDVVGIAGPGDPLANWEDVKETFDVVAETVPEAK  
10 RCLSTNGVWLPDLIDEVTELVHSVTITVNALDPEIAADIYDRALTPEGEVLTGKEAAR  
WIVERQEGAMDALKKERYILKKVNFVLVPGVNEDEVERVAERAADAGFHAMNVIPLI  
PGGDMKDHRPPTCRELSRARDRAEKYITVMRRCMQCRADVIHCRGRPRIWELLE  
ED
- <SEQ ID No.:0583;PRT;Methanopyrus kandleri>  
LGVASVFETVIYEGGVYKADEMRLVEDLGGFVLSEHQMQLEVHMLAVPVDDLD  
VIERKAEELLGEIRRMPLAGTEIAVVGMSLARHHMPHPVCDIAEYLRRHGAKSNVIG  
LARGYGRELAQLRTREKRLL EEHDLVIFVVGNFKDCIEKYKLPLVRRRIERP VVVVG  
GPEEIDADDVVYVGGIGRKPYPFRKGREITKLDEIVDVVSKIIIEERRQELAE D P P V P  
20 PMVVKDRINRELKIEERFTSPMPITLQLDGLRVKAPYDEWADRVAEVEVFGWKLREI  
ADIRSEMDDHILVKIRPKSAVTG
- <SEQ ID No.:0584;PRT;Methanopyrus kandleri>  
MNVRPGGPPVLDPVRLGVPMEVPEDPVELVRVFRVLVETLERGTL PFLGASYRSV  
25 NGKVYGPYYEARWKPRKGERGRTIYLGREDNESVQFLREWLETIRLAAPRLSEHR  
KAKWFVARAVRRALVPVLRQLAQMSAEHRAEVLQKLEEVKEGVSRTCSILRSVEF  
NPLRRLGWPGSGKEIIDSVLRLGPGTVRDILVDVLAPWPAWYSLRIVRLWRGEREA  
RRYWRERVGLYDRV KQREAA
- <SEQ ID No.:0585;PRT;Methanopyrus kandleri>  
MSRGTKAGIYRDVLVIEVFP GAVPDTGTLRALNERERRLLAAAGYDVTEFWARSFI  
GLLFDHPTPLVRASERHEKLLPEATVA AVRELCDRIEPEKLRKIRSRVASGETPREA  
VRRVLGSKMAGAVSRLGRVMGYVQSDPLSVAITLQVLGTMIADKRLEDVSTVLV  
VVPGLEHVHIDVYRLARRVYSNLVRAMKSLRRYLNPVRVRVRYVATGGKLEHPAGD  
35 SPEEELIEAYEELSRRPTVRRFFPERGHFTEVPWDRALAEFFVRVIRRELHRRSLKV  
VRAAKREGASGRELSEVYGREYKWLRSRWFKRGRRWLN FHRPSPALSDISCCFV  
ASEAGVEGYHEEFLIKVLQKVLREVVERVTGRRLVRKIVRKIARVLKEDFRVEGKIR  
EGILHMARLLGGRRKAALGGKTLLEAFGAPPPS
- <SEQ ID No.:0586;PRT;Methanopyrus kandleri>  
LDFYSPTFHSRECETAGARKMDVKTLVGEYYASLP SGVLREFVEDPSSREWAYTFL  
KGRDIVFTRKRRLEDEVSGFLELYHSTGKFKNPKSWEGLLGWDLVIDVDAELPEEPE  
AFLKSLGRLLKD VVIACDELRRALGFPRPDV VNFSGSKGFHVRYFDSTVRRWLRWD  
LHERRGIKPGEIIQRVGRGVVWLAREGFVAGDRVRALREGLLDDSMYDLKRLRCV  
45 GSMNVKSLLPAVPVWSREGGRWVDFRDEV LGMNDLELGCLVAHRTLTPGRGGL  
GVVLSRVLDLDTADPEDPSDFVEVWGNVMSVLGELKP
- <SEQ ID No.:0587;PRT;Methanopyrus kandleri>  
VRFVVPFADRGDRKTRLSSCMDEETRERFALAMLRHVVRVLSKFGEVEV VTPDSSL  
50 SVPGTKVRRSDASLDELPLPDGEFGLVMSDLP LLSEEDVERALEGLKDADVLCPS  
RRGGTSGVFVRKGVFRFPTFGGVSFPRNLRRAEKQGVEVAVVKS LGFFADVDEPE  
DLLDAALLGRREVAKIARSVVEV

<SEQ ID No.:0588;PRT;Methanopyrus kandleri>

LLSREEILEILSEYDLEDLSIATLGSHALHILKGAKEEGLRSVVVCEEGRTPYERLG  
VADEIIVVERFQDMLDEEVQERLRELNAIVPHGSFVAYVGLDGIENEFCVPMFGNR  
5 RLLRWESERSLERKLLKRAGVKVPKVFDSPEIDRPVIVKFPGARGGRGYFICSDPE  
EFEEKAERLIEDGVIDEEDLEQAHIEEYVVGTFNFCVHYFRSVVEDTVEVLGMDRRYE  
TNIDGLVRMPAGDQLEAGLEPSYVISGNIPVVVRESLLVQLYEMGDRVVRASEDIEE  
PGFIGPFCLQTLCTEDLEFYVFELSARIDGGTNVTFPLPYAYLKFGEIVTMGRRIAKEY  
REARDKGLLEGVVT

<SEQ ID No.:0589;PRT;Methanopyrus kandleri>

MLLIVAGHDPTGAGLRADIATAEALGVPVSLPTLLSLQDEGVELVEPVDSRFLSDC  
LARYVPRCEVVKVGAVPTLKTFEILAKRLRDLTVVWDPVFRAEAGGELSEATPEEAL  
ETFGETVDILTPTNEELSQLVGREVRTTVEAELAARELVEEYGLTGVLVTGGHSVDR  
15 RDVWVPAEGNTIAWEVPPGEGAHGSGCVLSTALACFLVRGLDPETAVERAVERFAR  
AAVREARNTPFGRVADPVAQIRRDATLGKATQHVIRALEIIESDPAFARAIPQVGMN  
VAEVFDPSRGLEGVVGSLSGRIVLDGDRPTAVGRPVPGGSKHVGTVALTARLDPS  
VRAAVNARYDEELIERARDLGFWSSFDRSEEPVEVDSTMEWGTEVAFRRADDT  
DVVYDEGDVGKEPMIRVLGKSAVEAVTKLRMLLGCVVGV

<SEQ ID No.:0590;PRT;Methanopyrus kandleri>

VSSFKRLLYLDVISRSHADFAKRVIRRLPEKVKVRVECLSKYEREDDALTYDGRDKD  
EEPWKEFLRRLGRESSDTVVATALNVPPDVPDISPNPTVVIGVNTGDHPKTLEVAGL  
ADVVVVGRRLYSPSTGPREFGRVRSGLRNGTVIVDVEDLGLRYASKAVPVIAVLV  
25 AENGVDGLIRDLRNRVRTLTTEEVLRLDLSLSQV

<SEQ ID No.:0591;PRT;Methanopyrus kandleri>

VSKAQILVVLAMLSVGLQSVSAAPIEGQFVEENDYQWSVQVTHCEPTIDMTKYPVIV  
GEKAVYLVLLDERDVQKGGGLCDYQPALMPVPKDYVEISGNKLSFKVNLEGQKLPF  
30 YCMYLGVDFFDKLVMVTIEELAKHSVRYDWGYISEPKPLTSLFLRKIVEAFESQVDN  
PFPHSAFKNEAVWNAVRDTPYIISGPVHVSAVDYGTDYVELEIEIPVRTDVTELTGTI  
EVKSGESTQTLSTVGTSDVVNGVIKKREYRRPRIPWK

<SEQ ID No.:0592;PRT;Methanopyrus kandleri>

VEVTIQLSGVVEGQQVTDVYPVTITVQLVKLNSSVNITVEKITESEAVLRVDYQINTEN  
35 CSVKSVEVKLLKDGNNVASEERSQAEGTVRFTVNESGTYRVVIEATVEWTTTPSGRH  
EEKLTLASEDVEVTLRLEVGAHSVKSVDYADWATLEITVPVTAVGCEVTGGKVE  
VIEAGTGHTLATTEATVDNGVLKATVKLTGLRSARIPVIRVTAEGKTPTGDSVTATAE  
ASVEVRLASAEELGGSVRVESPRP

<SEQ ID No.:0593;PRT;Methanopyrus kandleri>

VCYEIHTQNCTVESVTVELLKRTDQGWVVDRTLSATSDVVTFRVSEEGQYKVR  
40 TAQCTHGVMTAETEPVTVQFLPKVEISGFKVETDYGPDWVELRITADVHVERAE  
KVSGLVVEDAKGNVLGKFPVEISDHMDVKVRLEGLNV

<SEQ ID No.:0594;PRT;Methanopyrus kandleri>

VDSVLSKKVKRIVEVRGDQLVIETQTGERCILKVDERGELRPVKFLVIKSGSYEVS  
45 AGSAKAKAKARATPLILPILLRLVRRSTA

<SEQ ID No.:0595;PRT;Methanopyrus kandleri>

LRRYRIRPTDFVAVVSHFEARELLRAVRKGGIEIQDLGLHSGKARINGDTVVIEGV  
50 ELTRDELESMTGWKGAYGLTTDNVYRIEIRAEHYKLLPVRPGEAPTIEIDGIRMHRT

KWTDPWTDAGVKVGKVGSEGDRLDVCTGLGYTALRAVERGAEVISVEKDRNVL  
EIAGANPWSRGLLEEVEILLGPAEEVPSLDDEFDAIVHDPRLARAGELYSENFYRE  
LLRLLRPGGRLVHYVGAPGSRYRGKDVLAGVSRRLTRVGFVVDVDRRWGLVTAE  
KPSARV

5

<SEQ ID No.:0596;PRT;Methanopyrus kandleri>  
VLPDHGSYALVFRVNRVKVNVGSLGDVIVEAGSWTYVSGMGQGSSGLRGRLG  
RHLKSAREGTERPHWHIDHLLSQVRPEVEGAWIMEGDRECELAALADMVPGIRG  
FGCSDCHCETHLFRAGIAETAEAARRVGGGTFLPTPTLERWVSQL

10

<SEQ ID No.:0597;PRT;Methanopyrus kandleri>  
LFGDSRLVLALLVILVGATIANAGNLMYPLLSRDSRAHVLKIWYTYHMLADGRWDPW  
CPMWYSGFPYLTYYGSLGYLLGAAVDAIVKDPVRTFVCLIVASALIGVGVYALVRA  
RGYARKVAVICALLGLTSGGFMKALNWEVGYPTILSLGFGFLALSCYERWLRGEKR  
15 HLAYATLLLVPACYSHPLGGLLSGGLILTRGIAEAVLREKLRTPRFLLQSTAPVAIGIAI  
AFSHYAAAIYYKRFLSELWLYPGGSVAGVLKDLTVGGKWSTGLLVTVTGIVGVAYEI  
RRRTGFGFLVLFWGMVSIVTFAFVLGYWKYLPGLKNMLAERYTTVLMPMLLAVTA  
APVVRQLLRSVKAAWAAPLGVAGLLLSGSVGALTYVPPEPPHVTSSAMKLWKWMG  
DSWPDDSYTARCDADPYTHLFDASVPISPIYSGHPTIMGWFSQGDPMFFSLAARW  
20 EWELGWVYDPNTLKTSLWATNTRYLLTKSSLLSKKLSQEPGFVLRKKAGDYRVFEF  
LGHGGSACVPHPIAVVDRRLGLRTENAYTTLLNFVATPGNRYVFVDATFCDAK  
FDRVIVRPLTPGDVDRAVKLAREGRKVLILPVSDTRVARAVERLGV RVSPASPPSF  
VPLRKYLPSAYRVDGRWWKDVRVGHGLVRVCGVDVYFTMRFHRLIKEVQTEGY  
RMPRLPTDEERKFVNGVLRGFDSGKPTQVHLEYRGDPAVMRVCGNGWVYLKVKY  
25 FPAWRSSDGPVYPASCGQMLVRAHGDTVLRYPQLSLSYGSYAAAVLGTALGAM  
LLWM

<SEQ ID No.:0598;PRT;Methanopyrus kandleri>  
MDVIRAILVTALLYGVGWTSTVNVNWTIPHEMVRMSAGIYQSTGATTQLTLNYPYRGR  
30 ATLA VAYDPAVLVKLGDRGKPVRLSPSSLRVGRV/KVKS YGDAVVIHGPCSVRPYISA  
HGVRYSFDIIDTPGFSVYFNRSGLV/LVSHGKTTKIRVLPLIPLI

<SEQ ID No.:0599;PRT;Methanopyrus kandleri>  
VPELPYVAVPKHMAERARRVLSREDLLAKDVKARREEDMVLFPVRDAGRAGSVLE  
35 ELGIPYEAGEAEFERTVEHRSVEEVLEDSFGWSVPVPYDVIGDAV/VQIPDELRGH  
EREVGRAIMKVHRRVRVAFERGPVRGVFRVRDLRRIAGKGPVTEHREHRCRFRV  
DLARCYFNPRLATERLLAEDVVEEGSTVLDLFAGVGPITVILKRFVPSVEVTACELN  
PVAYRYLLENLRLNRVEARAFLGDAREVSRVGRFDYVIMNVPKMAHRFVETAVRC  
VRPEGRLIYYRIAPNAEEAFEELRRKADRPVELESHREV KPYSPESLYRLVVRVH

<SEQ ID No.:0600;PRT;Methanopyrus kandleri>  
VIPVTVVYHNVHSPRKVEEMARTVAGFGAKRFVISRALGSAAQEGVPKAQRICLEA  
GVELLFFQDLEEALKALSPDVTYMAEDAHEHGGAKPLDFDAVVEEIEQEREVCVFG  
SARPGTLTKQELELGDEAVYVGTERNVGEVGAVAILLHELKRLNQ

<SEQ ID No.:0601;PRT;Methanopyrus kandleri>  
VKKVVALGIVIVAVLGGALGYYYTTSNNVVRIGYQPSDHSAALFVAMAKKMFKEGI  
KVETYEYFKAGPPETQALAAGKIDVAYIGCVPAITAYS KGVPIKIVAGVNQEGSAIVVR  
KDEAGKIKDIDLKGRVAELMKGSIQDCMLRTALKRAGLDPDKDVIDEMKTADAV  
50 NALGAKQIDAFIEPEPGPTMAVKKGFVRLMDTGKIWSHHQCCVLV MRKDFIERHP  
NLAKKVLKVHVMATKYVQEHDPDEAAKITAKQLKVPEEVEKEAMRHVRYSDLDVDS  
IKMFARFLKQLGYIKELPDWSDFIDLKLLKEVAG

<SEQ ID No.:0602;PRT;Methanopyrus kandleri>

5 VIRNGDERLETLLKVSAPVAVLAIWQAVSGLGLINPVLLPPPSQVFSVFEVMPGEILK  
HALTSLYRVAVGYSAAGVAGVSLGVLMTYRTAHAAMDLLIEIRPIPIAWIPLAIVWF  
GIGDPSAFFIIFVGSFFPILINTISGIRSVDRIVVEAALNLGADDTALIRHVLVPGALPNIF  
TGLRVGLGVGWMCVVAAEMIAAKSGLGYMIEAQRLATDQVIAGMITIGLLGLVMDR  
GFRYLERRALVWR

<SEQ ID No.:0603;PRT;Methanopyrus kandleri>

10 MAVILKVEDLHKSYYDDLKVLDTGITEVSEGEFFAIVGPSGCGKTTLLKIIAGLEDYDAG  
RVLVDGEEVREPGPDRLVFEQYAIFFPWKTVLENVMFAPLMQGKDPEEAERIAEC  
LKVVPGLGFEFEDAYPKQLSGGMKQRVAIARALAAEPRILLMDEPFAAVDAQTRNKM  
QEELLKIWERTGQTILLVTHNVEEAVFLADRVMLSPRPAEIVDIVEIDLPRPRDRTD  
PEFVELRARILDMIGSR

<SEQ ID No.:0604;PRT;Methanopyrus kandleri>

15 MSGHTGPELAPELERHGVGMVILGGYPGDDATYRASKLVARRRDEFVPPDRLPE  
ELSRVDVEIPVAVNVRFADPREAGELSGELADLVVVEINAHCRQPEIVRAGAGEAL  
LEDRTLIEIVEAVAHDVYVSVKLRGPHPAFEDALEALRDSSVDVLHVDAMKPGEP  
20 TYELEYVRAAARVGVPVIGNNSVRTPEDVDRMFEGASAVSVGRPILEGDWDVLER  
LVRYTVLRKSSEAGLART

<SEQ ID No.:0605;PRT;Methanopyrus kandleri>

25 VPLRSDYRYRSITLKIVGPEGYRRDLIFLSDRCTAVYNELNYLRRRFFFFKGKLDAAVAV  
SRSELTFRRIYREYGPILGTQTVAIGEKNTEAWRSYFKQIKEVKSNKRRTICQPPRY  
WKGPLGREPRFVFLASQIRFEYDPLEHRGVIEILGLGDVVDNLPNVGFKRGRGRG  
VRLEFVGWFPWHPNRVKEPKRADKIILNGDDGKEFFGRSEIVYSWADNAHYLTLMN  
KVNKGESWLVSRTPNGRVRPIPTGNNCENAAVDIGRRIFAAYVFSKGKPVLV  
RWGDAWSRWWSYWRKIKAPKEQRRNLKNGANFSHRLKQYYVKAHRAIMDAIRHLVS  
30 KLVQILLSREVTLVIEDLKGLRQKLHGELAYWAYKRIIREIKRKCEEYGIEVIEASPAY  
TSVTCPMCRSKCKRNGGLVICSKCGKTMNADIVRAYNLLTRATDDPPEPELEYLTG  
SNCTTVLPSNHKPPITPNR

<SEQ ID No.:0606;PRT;Methanopyrus kandleri>

35 LVSVLRTLLRIPAVRRSLVVLSSILLTSTVIFHFLEGWPLLTCLYFTAATITTVGYGDVV  
PTTEAGRLLSVIVMFSGIGVASVALGDIQLVFRGELSLAIKEDVLRKRIKEVENHIIVC  
GFGRTGSRVARLLSERYKFDVVVDKDEEAYERAVYQGFPVAVLGATREDTLQEA  
NVESARGMVVATGDDRTNVFVTLLAKNFRRDLHVAVANSREGAKMMERAGADE  
VLFLYDCASRHIVRAALSPTMFRVTVRHSVDEISDVMWIIIGNGGVVQCVEYYTPPLK  
40 SPIRRDVVISSMDEVMRVKSLEKYPKRTLEDLYRVSENVHTYYVIVHNEEERER  
ILRELDRRGYLVGVDLTIDEILQEIERLRGE

<SEQ ID No.:0607;PRT;Methanopyrus kandleri>

45 LSSGFKRPSPTWRPKEEEEELIELIVEACPTEGPRVKAGDDDDAAVLDPDGTVVNFDA  
MTRSRHVPKELRDRDLGWKFVASVSDVGAMGGEPSFFGFSVCLDDEVDEQLV  
LGISEGLREFGVSLIGGDVVEGEELVLSGTCLGKLKGEPLMSNARPGDVAVTGPL  
GGPNAFVRILNGMEPEETLYERFARPRPPVEVGVELARGGYRAAVTDISDGLLAE  
AEAIAARRSGVAIEIHTWKVPVDEGVVEVAQEFDVPVDLALEGGEDYEFLICGPEDV  
VKEFGLTTIGRVTEGEGVRIVRNPRARSE

50 <SEQ ID No.:0608;PRT;Methanopyrus kandleri>

LKPELKRVPREELESIANEMARKFNCERVASVVRSFHLIKLEGRWTEYFVVRVDFD  
PADLPERADPFLVGRPF CERSARGDLRIHVEGARELARRVDEIKTYVTERAAVLFTY  
GRDVLPE SIVEIRGPKEPRLVAVVYRDDLGECVGVGRLRFSEDGRPVVDNIDRG  
WYLRRGG

5

<SEQ ID No.:0609;PRT;Methanopyrus kandleri>  
MLAISMDVENVP GALKAIAGVIADHGGNIVHIQQDSEGELARLYMEIEGVERPKVLVS  
ELRSLDVVREVRVLRPLKEIYGKRVIVMGGGAQVAEVARGAITEADRHNI RGERISV  
DTIPLVGEENLAEAVRAVARLPRVGILVLGSLMGGKIAEAVQELREEHGIPVISLNM  
AGSVPEVADLVVTD PVQAGVMAVMAISDAGVFDLSRVGRKF

10

<SEQ ID No.:0610;PRT;Methanopyrus kandleri>  
MLLEKSLEEAPVVRNGYWYFIHPITDGVPELPPPELLREVAYRIVRALDSTDFDKIVC  
VEAMGIHLGALLSDMLDRPLVIVRKREYGLDGEVEITQEKG YGVEKLYLNGVSEG D  
RVVVVDDVISTGGTLVGLINALDDVGAEIEDVVVVVARGGLDRVREETGVDVKYLVR  
VEVSEDGVS VVESRYR

15

<SEQ ID No.:0611;PRT;Methanopyrus kandleri>  
LYPMLRDFLVTEDAVFSVISYVHPEDGFLALMRYVKDPEGDRIRRP TGERYRKVSFE  
ESFEILRERHPEYVRKVRGDFYDQVPPEDVVEHLHPRDRMERILEEPRDDLEEMA  
ARAVLELAEDSGVPESRFGVTGSLLPELHDPAESDLVLVYGVQEF LAVRDAILRIQ  
ETGEGRDLLRALDYDQWERVYRRRSPELDFEEFLRHELKGNRVVIGDRVCDVLL  
VRDESELSDV RWEFETVEENVRLVCEVLDDSLAFDYPARWRVEAVESDTEEGYE  
VTEVRSYTHTYVGQAFEGEVIEVSGKLERERN SGEIAIVGSSREAEGEWIRVLKDQ  
R

25

<SEQ ID No.:0612;PRT;Methanopyrus kandleri>  
LIEERVEGAELRVVRLEPGERFPESVDTSRWRNSVVVSGKGSVRALRWRLGDTPV  
FETR GKFELISLEGLLFDG SYHLHASVSDENGHTLSGHVKGF EYTTVELVLLRLN  
ARLERGRDPHTGYRELTRVIPSARDTRAR

30

<SEQ ID No.:0613;PRT;Methanopyrus kandleri>  
VDDEFQEAGKVVKRVLRAAREIDIGDRLLIEA EYLEECVRDQGAEPAPFVNLSLNE  
VAAHYTPSPDDEVEVSPGDILKVDIGA HVNGAIGDAAITLSFDNDLGERLAEAAAREAL  
EAAIETIRPGVECREVGRAIGEVC RDRGFKPVIGLTGHQIEPWN LHAGVSIPNDDL P  
GYEDKLEEGMVLAVEPFVTTEDGEGDV KPGSTVEIFSVRNPNQRSRLNLHRIYEDR  
KSLPFARRWVGKAPRVKFELLRLSKLGAVKAYPELVEVNGEPVAQWEHTV VTER  
GCRVLTE

35

<SEQ ID No.:0614;PRT;Methanopyrus kandleri>  
VETVRISVLDVVRRIADVAALSVFEVIRDGPLDVLGCTVFNIELARRLVNKGLDVRLV  
SSEVG GPKGLPVVEEPASDTLLVTEPLTFYSEYHLLRSHALVLMFRYGNPGFKECL  
RGLDCTMLLPEIEGRPLPDLHTAFVAVLQEAVTSASEGHHVVGLRVSDTSDYFIPNS  
DPAEVKRRDDAIVVRAIPPYRLREGRVWEAVARA V DQVRFRVSR CFQK

45

<SEQ ID No.:0615;PRT;Methanopyrus kandleri>  
MKKDELFLLSVLYYVLEYLKMEGKTREDDVKLYDEFNVKPGHLHKT KLQHKCAVF  
LLAYVIARAISSELPKA EGLGQRLGKLLEELFEELKRRGEEVPVEPP

50

<SEQ ID No.:0616;PRT;Methanopyrus kandleri>  
VKKDFTLDDIETTADIKIPDNPLDMVIGQDHAVEYAKLAAKQRRHLLL VGPPGVGKS  
MIAQGIAELLPKPREQIEVYHN PANPERPIVKVTRDEVEKEDSDTLLSPEEVPEPVA

- 5 EQLGFRCPSCGEYSDDPCRYCPRCGAQKYSARTYRATQYDRATSRQVAVIYERVG  
DRIRVVKPDSEGEKKVLVPLDRKPFVQATGASETELLGDVKHCPWGGDEQLGEP  
PYKRVIPGAVHEAHEGVLFIDELAQLGPLQQHLLTAMQEKEYPITGKNPQSSGA AVR  
VEGVPCDFILVGACNIQDLPMILSPLRSRIQGEYEVLMKTTMPDTEENRAKLAQFV  
10 AQEVERDGRIPHATREAVEEIVKEARRRARRVIDGERDALTLRLRDLSGVVRLAGDLA  
VMEGAKYIEPKHVRAAIKKAKPVEDQIIIEYGSLEEGLRRDVATCSLSSPAAQQRVIQ  
GDTTDSYYHQEDKRGYI
- <SEQ ID No.:0617;PRT;Methanopyrus kandleri>  
10 LSKGRTDYNGAVKYVIRAKLRANGYVERPDVVGAI FGQTEGLLGDDLDRLLKT  
GRIGRIDVKLRNENGKTVGEIIVPSSLD RVETALVAAALEQVDRIGPCRAEEVVSID  
DIRKEKRERMIRRAREILRE MVSEVTPDSSSELVQKVKEAVEDVEVEEYKGLPAGPNV  
EDSDAIIVVEGRADVANLLRCGIKNVIAVEGTNVPEAIVELSKEKTVTAFVDGDRGGE  
LILKELLQVADV DYVAKAPKGKEVEELTRKEIKRALERKVPVEEYLKEIGERPKDKER  
15 EKGKKPKPKRPERRGRPRKKKARP KRGPQERRLLDRLKRLKGTFR AEFLDEGLK  
PVKEVELDELVEKLKSEDGVRAVLDGVITRRLVEAAREKGVKYVVG VKEGDLDPEI  
KKDVKIITMS
- <SEQ ID No.:0618;PRT;Methanopyrus kandleri>  
20 LADSVLINGYGTIGKRVADA VDAQRDMEVLGVVKTSPDY LARLAVEEYGYPLFVPE  
DRVERFEDAGIETEGTVEDVVLNAEDYGLDVVDCTPEGIGARNKETLYEKAGVKAI  
FQGGEEAEVAEVSFVAQC NYEEALGADYVRCVSCNTTALCRTLGT LKEEFELGRVY  
VTIVRRAADPHQVKKGPINAIAPNPVTVP SHHGPDVKTVM PDIDITTA AVKVPTTLMH  
MHVVRVELKEEVTSDDDVIDAFEEARRI WVPHGEGLGSTAE LIELGRDLGRKRYDLY  
25 EILWWEESINVEDGVLYYMQAVHQEADV VPENVD AIRAMTELEEDPEASMDATDSA  
LGVLNSPPL
- <SEQ ID No.:0619;PRT;Methanopyrus kandleri>  
30 MVTSESEHRVCPKCGSTNLERDEKHGELVCRDCGT VVDYLIDYGPEWRAFNADQR  
AQRERTGAPISERH PHKLGD TIIDDRTRGRRLVDWRFRRLKRWDRWISNDPVSR  
NIRSAVELIERVCSQANIPRSIVDEAIRIYRKAVEKDLVRGRSIENTAAAALFMACKKR  
KHPRTIKEIAKLFGITPKDINRTHRVLRLH LNERMPAPDPKQYLSRFATELG VSEDVE  
MLAREILEKAEEKGLTVSRNPAGLAGAALYLAGLLKAKEYIEEYREKMKAEASEEEK  
EKLERELNEKLRTCRR TQPEVAKISGVTEVTIRNRYKELAEELGLEVPDPTKIDVPA  
35
- <SEQ ID No.:0620;PRT;Methanopyrus kandleri>  
VRDIGSQPAAGVRS MKVRDRALEIIRERISRGDPLYDFTGLASRPKVDAASDELRTY  
LSEALILPEIRELCREHFD APEYEV LVAPRTTAAVIATILALEPRSVLH VLPEDGEAHP  
CVEEGCRLAGAEYEEVEESEIPDL DGF DLVVVTGCDVRWNV VSED TLREVASAEAV  
40 TLLDDASGDRVRR LHGQKPGPRYGFDLVVTSCDKLMDGPRAGVLIGRDDLVEGVR  
RVCEGYGWTVDGPTLAAVKRAFE EFELSSLEARLKE LERVYERLKD EL DVERTGAG  
LVFHGVEREVEIGLGLLRRYGIMTIT ALGYERVDRTLRFNLLTEDAERFGYDRFVEVV  
KGELS
- <SEQ ID No.:0621;PRT;Methanopyrus kandleri>  
45 MEKLP GKAPAYVCQEC ELVTPLRRCPEC GEGTDPLRVTPPAELRPVGP GYLEFIRE  
VLVEEGLPADLVRDDELLANRAPDLDYLDEIVAAEPVLALRYDLRKDRWTIVLKPE  
GARRLHELGGKSIEVDRGAAEAVREGKNLFAPGVT SADDVEPGEWV VIEHGGRPV  
AFGRARMSGDEMVRNRGLAVEVRGAVEGSPTYFRGRDFEDVARAHEEYV SERL  
50 EEAVTFAREN VSPSRTFASFSGGKDSLVT LVAAEAGVERALFVDTGMELPETVEA  
ADRAAEAVGIDVEIVEGDPEIFHRVTEALLPPSRDNRWCTLA AKLTPVTRYVRSEFG  
RGCYTLVGVRRYESEAR SERGRVWDS DAVPGQVNVAPIFDWSSLDWVLCVH SKD



LPYNPLYDEGFDRIGCYMCPASKVGDFRLSERVHPELWEGWMETLERYRERHGLP  
RDWLRVHVWRWLRPEGEIRKVASEESLRWGERVLGRWREVPPEEAARGFRREC  
PGCGYCGAVGSNRCEILEASLRRVFGR

5 <SEQ ID No.:0622;PRT;Methanopyrus kandleri>  
LALGRPSYRGGRVSGGRDPDFAELESSSLEQDREIFHCDWNSVHAVSLWEAGRI  
DRSTAAGIVEGLVTVLEEGPDRLPEDAEDVHEAIESRLHEVVGEEAGWLQLGRSRN  
DQVATSVRMRLRERALDLSRELVGLGRALLDLAREHAEVPIAGYTHLKRAQPCTIGF  
WMSTYAAAVARSARGLLRVPGMDECPLGCSAFP GSTVPVDRHREAALLGFRKPAR  
10 HCGEATALRGPILEFLGRLATAASELTRLAGDLIQLCSDELGVVEPPDELSSTSSVM  
PHKKNPDALELVRAELTVVAGLKGLGDAVHGKLPFYNRDLQVLNGLLWDSVNR  
ELCVRVLRKVVEGLDVDEEAARGTVLGSHAAAVDLAELVAERAGLTFREAHKVVG  
VSARLDREGVPMSPERADRVVEELEREGVKLRVEEVREVLSLKRTLRRPVEGST  
PGRLEVTLDRRLAELAAERLEGTWRGRIERALRATEAAVNRLGVEGFAEVYRGY  
15 WDGEAPG

<SEQ ID No.:0623;PRT;Methanopyrus kandleri>  
MALLTLILALGFTSLPLNAPPHLSADVPTYPWVG VYPPDVEVTYVNNWDPNLNPE  
HIEDWKCIAREILGDPKSWWEQYTAGTPLDELVYEA AKKIEYWVSPYDDVDPHGIKY  
20 RYYNTRYGAWKTLQLGRGNCCDHAHVMVALCRASGIAIRYRHEVTRFPCWGTCD  
HVCVEVGLPENVDGKSQDVKWVRMDPTNPNSQCVRLKATYPNLPF

<SEQ ID No.:0624;PRT;Methanopyrus kandleri>  
LTFVTPRVSPTESDIEVGSWKEIEEIVSSLSSGLVRITTRDHEDIYDCFFIVEGGAVVG  
25 AYLGRIRAEELSAAEEAVRAIRDVDSVGFALLDVYELEPELLELIKRVNDECLLKEPFT  
PTEVEEAAPEVEEPEERDELLEKLGVLDIAIYESVEAVLEDYFEEEDPFEEFKRMLRA  
LGTQDARVYLRVKVPEGVDERMLEEVRRDLEHALSEFSIDGVEITPSLKEKETVTLRI  
RDIMKRIRGG

30 <SEQ ID No.:0625;PRT;Methanopyrus kandleri>  
VSVNENALPLVERMIERAE LLNVEVQELNGTTVIDCGVEAAGGF EAGLLFSEVCM  
GGLATVELTEFEHDGLCLPAVQVTTDHPAVSTLAAQKAGWQVQVGDYFAMGSGPA  
RALALKPKETYEEIDYEDDADVAILCLESSELPDEDVAEHVADEC GVDPENLYLLVA  
PTASIVGSVQVSARVVETGLYKLEVLEYDVTRVKYATGTAPIAPVADDDGEAMGRT  
35 NDCILYGGTVYLYVEGDDELPEVVEELPSESEDY GKP F MKIFEEADYDFYKIDPGV  
FAPARVVNDLSTGKTYTAG EINV DVLKESFGL

<SEQ ID No.:0626;PRT;Methanopyrus kandleri>  
MALWLDVPVAPTDSFYRKLFEAVWRILGDRARGIASERLPALRRCYTVSPDSSTFLS  
40 ENVPGVRLLD EFRPGELLEILSETVSGELGRRFWGSLVVSVERGDVAGLEAMKR  
SIEALRAVDVTPWLDALALDVLVALAEDVGEDILGDSLQLVAERLDVDEDGVL RVSP  
LALEFAGYCFEMILLGYVVAYRKPEEIEVVS CDVFAVEDVRRDIERRISEVKSGDLEL  
AAEVIEEVLAPYLRVVT DVRGYLEEARSM DP SIALEVDGFSVSIAPKELDPEWDRHV  
QEAIEKLTGSGGKARRVFN  
45

<SEQ ID No.:0627;PRT;Methanopyrus kandleri>  
MSEESVVAFCCYEUGYGAADLAGTGRAQYPSSVRIVRVPCTGRVGIEHILTALAK  
GAWTVFVAGUKKGECSYEDGNLKCERRVQA AKKLEELGIEPERVEIYFMSSAEAD  
KFVA AVKEMHERAKELGPLA  
50

<SEQ ID No.:0628;PRT;Methanopyrus kandleri>

VKRVELEGIPEVRGTVCPPPSKSGSHRALIAASLCDGSTELWNVLDAEDVRATLRLC  
 RMLGAEVDVDGEERLEATVSGFGDSPRAPEDVVDGNSGTTLRLGCGLAALVEGT  
 TILTGDDSLRSRPVGDLLAALRSLGVDARGRVVRGEEYPPVVISGRPLRERVAVYG  
 DVSSQFVSALLFLGAGLGALRVDVVGDLRSRPYVDMTVETLERFGVSVVREGSSFE  
 5 VEGRRSPGKLRVENDWSSAGYFVALGAIGGEMRIEGVDLDSSHPDRRIVEITREM  
 GAEVRRIDGGIVRSTGRLEGVEVDLSDSPDLVPTVAAMACFAEGVTRIENVGHLR  
 YKEVDRLRALAAELPKFGVEVREGKDWLEIVGGEPVGARVDSRGDHRMAMALAVV  
 GAFARGKTVVERADAVSISYPRFWEDLASVGPVHSV

10 <SEQ ID No.:0629;PRT;Methanopyrus kandleri>  
 LTEIARAATRYEPEETAALRIATWYLVRRSLDFEAPATLFWAGRTYARALLRVYHVL  
 SIREFLTICIERVLGTSYDLNEDVVAAAPCPECAGFPRGYESVCDATRGFIHETLAAF  
 GREPHKVREAKCAVRAGELVNACAFEIRHSNLH

15 <SEQ ID No.:0630;PRT;Methanopyrus kandleri>  
 VDLTEETLLRGAEATAEAFAPYELLTYDRLTRIALIEVARETGTAALFEAGRRLVRILG  
 GDDLESVLCFAEVEFGAEVEEGDVTVRKCPECAGLRGIDGPVCHLTRGFITEAY  
 RLEIGRPVTVAETRCRAAGD

20 <SEQ ID No.:0631;PRT;Methanopyrus kandleri>  
 VNTLGRFLFRVTTWGESHGPAAGVVDGCPAGLPLSEDDVQRELDRRRPGQSGVS  
 TPRSERDRVEILSGVHEGRTLGTPISMVWNEDVDSSKYEPITRPRPGHADVTYR  
 WKYGHVDYRGGGRASGRTTVGIVMGGAVALKLLREAPSNDPLGIEIVGHVVRVGS  
 VEADPGDLSAEEIMQYAESNPVRCADPDAAEEMLGEIERARENGDSVGGTIEVIAE  
 25 NVPPGLGDPVFGRLDGELAGALMNIPAVKAVEVGSVRCSEMHHGSEHNDPIWWD  
 GHPVVDGDNSGGVLGGISHGGRLVVRVHVKPTPSVSPQRTVDLESEEEVEIEVE  
 GRHDPICPRAVPVAESVVAIVLADAVLRAGYVNPDSVELPAASVEDRWRTLKRHL

<SEQ ID No.:0632;PRT;Methanopyrus kandleri>  
 30 MPGCGIGHGDDPTQSRGRDEPARHVGADGSNREAGCLLARELGDDLESTLTTFAD  
 LTGCEVDADEDVTVRNYPECAGYPGARGPVCHFMRLIAGAHELETGERTPVEE  
 VRCRAAGDDVCEFRIGRKPREPTVPRLDGLDERALRRMAHAASEREPEEVA AFL  
 ASEYTLKFHPADAAPIFFRAGRLYARALLRLYNPLEMTSFLSIVEDVTGAECHLGE  
 GNRMSIEPCPECAGFPREHEPVCHGVRGALHETLGTGKEVERVEETEECAAVTGE  
 35 LVGRCEFRFELRGL

<SEQ ID No.:0633;PRT;Methanopyrus kandleri>  
 LEKLVLLPGPVMVHEDVLLRSAKQVMNHRSEEFEEILTECVELSKYLFQTDGNVAIT  
 GSGTAAMEAAIYSLLEPGEEVAVVNGKFGERFADIAERRGAEVRRVEFEWGKVA  
 40 DPERVEEALADSDAEVVTLVHNETSTTVLNPAEEIARICREYDALFVVDIASSLGGVE  
 FRMDDWGVDVVCVTGSQKVLGCPPGLALVAVNDRALEVMEEKDAGSYLDIPKYLE  
 YLEKDPKQTPYTPAVNAFYALHEALKRLKEEGLEARWERYRLMQRIVREGIRALGLE  
 LFVEDDEIASPTVTGVTYPEGVDDREFRGEILRDYDVVVAGGQDHLAGEIFRIGHM  
 GEVRIRDMITAVTCIGLGMRELGVDDVDVGAAAEAMADVLSVS

45 <SEQ ID No.:0634;PRT;Methanopyrus kandleri>  
 MRRLPRGVLCVGLRAVAFSADLSEDDVRVSRGLLRRVERDLKELRRGFRDELMYV  
 VLGPVCGDDLAVVYVVEEGALEDVNAAVFDLFREYGGEDVMGVSESPGAGEGGS  
 YAAACPESEYQDVVTLFDTYAAENRVAEVAEVCRRAAEGLCYDVGGGPVQEP  
 50 EIPGVGYVGPETDDPVLIATTERLDQVGPTAGAILGAGRGAGARPVRRGAPAEVLP  
 GTVIFSVAILNGNVIDGVRALEEGTGTERWPLRYL

- <SEQ ID No.:0635;PRT;Methanopyrus kandleri>  
LVTVLEEEEDPHAVKHVVRALRAGKLVAIPCDTVYSLSCDATNSEAVRRLYAAKERPK  
DKPVSVAVHSPEKALELLEPVPRLEAALETLTGPGVTIVAPRRPGVVAPEVAAGRRT  
5 LGVRIPDHPFFLRVRRFGKPIVTTSANVSGRPAPTDPDDEVFEQLGDRDLILVEGEC  
RFGEPSTVIELTPEGNIDILREGAMPKEEILETLRGTTSGA
- <SEQ ID No.:0636;PRT;Methanopyrus kandleri>  
VPEKGLKPFLTGFRETVDLTDGEGVLVYSGCAGTCTPFAELLAFTLRGTDLEQYYYS  
10 IDLRREYLRLMELRDHGYTVTDEREELESADVVLGGLAMPISDATPDAREFLEEL  
GNPPLVGVCFMNMFERAGWTDELDFHTIIDGYLEVTVK
- <SEQ ID No.:0637;PRT;Methanopyrus kandleri>  
VIEKEPVPLQVG DYRLYFRLWALGDADAISDVL YRELYPHEWLEGSREVVDVGAHV  
15 GAFTVLA AAHGAREILAIEPHPDNAELLRRNVEENDLNAEVVEAAAYDREDVVKMYL  
SPSTVAHSVELVRSRETIDVETVALDDLGTSPDLIKIDAEGAEERVL RGAERTLEEHA  
PVLLISAYHYPGQEEDLRRWLEDNRNYRVEVLVRETSPYRSPALRVPVIVAEPR A
- <SEQ ID No.:0638;PRT;Methanopyrus kandleri>  
20 LIVLHARDCDPKACTALRAHRMGLVELTRHPGDVPTGAVVLDPTVEKALSREDRDA  
ALERGLVAVDCSWEHVHRYFGPLRRRCRHRILPYLIAANPVNYGKPKCLSTVEALA  
AALYILGFRREAE EFISRFKWGPAFLELNRRERLEAYRRAETS AEVVRVQEEFLPDGL
- <SEQ ID No.:0639;PRT;Methanopyrus kandleri>  
25 VGGNAYIAVTGTDAALNPVVEIWTAPTTSVITVIPPNPTVPVTMAGTISGVKLT KIDAT  
HLLLAILGTNAYAVLDITNPSSPSLT VVRTLAPPAGFTNVVIDDADGPYIVAHDSANPA  
SAVVFKIAADGSVTD SLTFSVTAGNQPATISMYGGSPMYLLVTDTS GECYLVKDG  
SLSVVPLLR TSLVSGATPIFATKQFV FVGSGGMAYNVYVWLPTIRTHRQMIPIPPGWM  
GMVPNVVVLEVPEVSGEDNIGIDE EVPGFYGFQLKTPTVPAQVTYSSGQIVAQATG  
30 GVSSDMVSEVYPTAYGIVLNTWPNAIPALVIDIANMDCYLAVV VHNVTIDLSAETISVT  
PESPTYKIVGAITVKASWEDLFGMAHQKTLDLTGRLSATNP DGTVPVGGITYDPVTGL  
VTIIGAKEPKVLVKIDLNDYLEGLRTVALGTGVPPVTSLEQRVSNLEHAVSTLSAQIG  
SMSSEIANIKSDINNINAEIQEIKNGMKKGVPVSPMVVLAGLLAALAVLRRR
- <SEQ ID No.:0640;PRT;Methanopyrus kandleri>  
35 LGNLPRPAAWLAALTAVLLAVVGP AHGLTQTNAALNPQPVQGLNVEGASKPTSLVI  
DNSGNLGAVEAGNPPTQAWTTAPIVATVYTQPKVAKAEMVGGNIDFTVSRHRHHD  
RYDLQVHRHRDHQREHTDGIDRPADHTDFVPRCAHRHNHTDGLPPARSGR
- <SEQ ID No.:0641;PRT;Methanopyrus kandleri>  
40 MAKFPEAEARIFNKLICMKCNARNPPDATKCRKCGYKGLRPKAREPRGG
- <SEQ ID No.:0642;PRT;Methanopyrus kandleri>  
MGVFGYLRERTPCHLTLLDPVDVGPEEVPEVLES LVKAGTDAVMVGGSTAHASQV  
EAVVEAIREVADVPVILFPNGPEGLAPNADAVLFMSLLNSRNTYYLIEAQVKGAPLVE  
45 RFGLES IPTGYLIVGEWGTTVSVVG DARVIPFDRVEVIVAYALA AKHLGMKAVYLEA  
GSGAPEPVPEVVRVSGIGVFTIVGGGIRSPETARELAEAGADAI VTGTAVERDPD  
LAAEIVEAIKDL
- <SEQ ID No.:0643;PRT;Methanopyrus kandleri>  
50 VEYPSIPRTLRLIMWAAYWINAVSVIATILLSRSRLNPPEQTYSFLAIAVFLAALGR  
ALQRITGRRVVLTRDAVKFDGERIPYGDIEDVRVVEAGAVSVVEIRTTDGRVHRLRV  
ADPDRFLRDLVGLLRFKGP

<SEQ ID No.:0644;PRT;Methanopyrus kandleri>

5 LRAVALLSGGKDSTLAAHLAVEEGYELTHGLTVVPSDPESMMFHVPNADLGALVAQ  
VMGLEPVRIRSGRDDEADIEEIARVLEGLDVDALVSGAIASRYQKERLDRCLCEELGIE  
HVVHPLWGMDPFEELELLVERGFVMIIGVSAAGMDESWLGRRIDEDFIEDIRRLYEK  
YRIHPAGEGGEYETLVLDAPLFERRIVLERVEKRWDFSGELIVEEARLMPKRR

<SEQ ID No.:0645;PRT;Methanopyrus kandleri>

10 VGRDEGEDKFDGGDEGTSDEPDVPEIRLDGESDGPDDHPEGPDSDSEPQYPQNI  
LSHEGDHTDIDVSNNTAESDLEADLDSNSYSESSSES DATQYTAQYSDLDQDT  
DQIQDSRSESISDVESVQESSSESNDVDVNDVNDVDDPADPGVIYDVDREVN  
DDRDTYVEENVYYGDTDRTIYDPRDSDTGSVDPSSDPTTAGDQVVGSED PYMV  
LDTQKGQVDVLVGEDPTTINMGQSELSQLLDLVNWL DGNAPSDVLDLLYQLLAYLL  
15 ETFYGLIPLDNILNMIQQAIEYALSGELGLDVLNQLLG VLETATSPLYAATEILKFLGDL  
DLGLDALLDIDI

<SEQ ID No.:0646;PRT;Methanopyrus kandleri>

20 LSRNVLRNRGQGGVEYLLAAACVWAFLEISVLWWVMAKDAGRAAQEAAKMAAE  
MARQKGVEIVEKYANAIT

<SEQ ID No.:0647;PRT;Methanopyrus kandleri>

25 MAGLPTARPDATPVRAPERIRVPEPPRPDVEQARVLRVLLETVRRGVLPFLGASYR  
SVNGKVYGPYYEARWKPRKGERGRTIYLGKSENE SVRFLEAWLWEVRRAPRLAE  
HRKAKWFVARAVRRALAALLARFEGDPEEAELEAGEVLRKVGGILTGMFPDPLRTY  
SRPRGGRKLLRMLLGRTPGEFRDVLLEMLSPWPPWYCLTLLERLHGRTAAREYHR  
ARVPRPGSAA

<SEQ ID No.:0648;PRT;Methanopyrus kandleri>

30 MRTWKIRVRGIVQGVGFRPFVYRLCTEMELDGHVRNLGSEVEIVVKATCDELEELIR  
RLKEEHPPLARVREVHAEETEEDVGPGRIVESESESDVELQIPDAPVCEECELEI  
FDPKSRRYLYPFTGCTNCGPRFTIIEGIPYDRENTTMVDFPLCEE CRREFEDPEDRR  
YHAQVVCPCPRCGPRYRLDADGEVVEGELEAIREACELIEEGKIVAIGIGGFHLAC  
KTTEDEPVAKLRERLGRPQQPFVMSGSLDDVRTFAEVDGTAEDLLTGVPVRPIVVL  
PKKEPFPLSELVAPGLHTVGVMPLPYTGLHHIMFERFLDEPAIVMTSANPPGEPMAIR  
35 NSDALRHLRGIADYYLVHDDRRIARCDSDSVRVLDGRPRSLRRSRGYVPEPIELEW  
APDDLTVAVGPELDTVACVLHRGKAYPTQHIGNTSRAQTLDLFLQETVERFLRLRL  
DWNVDVAVACDLHPSFATTGLARRWAEEDLELVRVQHHAHALACLAEHGLDPA  
EIPAIAAAMDGYGYGDDGSAWGGEILYVDGNEYERIGHLEPVSMPPGGDAATYRPL  
RMTAAHLHAAGWSEEEIREFLRLLEEWPHALKHGEREVEVILHQIEHPTIETTSAG  
40 RFLDAVSAALGVCHERTYEGEPAMKLEAVAVRVDHAPEPDVDVRNGSVRVSSVVA  
RAAETGDLRYALTAHHAIEGFAEVIDEHRDGEPAITGGVFNNELITRGFRELYGAD  
LLEHHEVPAGDGGVSLGQVVAAVLELR

<SEQ ID No.:0649;PRT;Methanopyrus kandleri>

45 LDHDAVAMLM EVRADLKEVKALYQRLARIIRQAGLTNDYEYIISTAAALLVHDKYEKA  
REVLSGLKNPREGAMLTMAALREASLLDEILGEHTVEPAELVNVGVGSFDEALKKLD  
EYLVGEGEVRRQPGPDMSYL RATDGAISNHLLGRTVGYTLNTTPRDYAEFVENS  
AFAYARLLPSHQWRVRLSLEPYVTNPLSPPSLMRTLELVDELDP ELVMSEL DVSE  
NTFLRYKYKTLVRYLLVHPDHEICEPTELGERALDDEEVLA EIVLKRGFWAILSKHPNG  
50 GSVAEKLAKRSVVRNRMKWKDEVDISLLVDAASDTDRAEAE LPVVLAVHAEELSTV  
HLAARAGVSTGVAAEVLYEHFPEQDWEGERFGL

- 5 <SEQ ID No.:0650;PRT;Methanopyrus kandleri>  
VGGRPGVDCGGFCRYCYFRGVDWEEKRPFPGCKNCPPGSPGCDYCGRSVWEDN  
GPFRPPGVVLQEVGMSLGFRREREATVSGGGDISNYPWLRELVASLRDLGIRSVQL  
GYTSGKGFEDPEEVEELCDLGVRSVSYTVFAWDPELRREWMGDRSPEASLACLEV  
FADRCEEVMVA AVLIPGVNDGDVLWKT CERLEELGIDALLMRLGTREEHGII LGNS  
LVLDVKPHSLDEFK RIVTEVHEEF PFRVTGTPLWDPETSAPFALRTLGEELRELLPP  
VEVECSLITGRVAAPLIREVFRHVEGGEKVDVVPVEKDVACLITERDLERLDVSSLKR  
TVVLPGRALVHDARAEELLKRDGFERVVLRGPDRLTLDGEASCEVDREEVLEFELN  
AFRDLINTVNILGE
- 10 <SEQ ID No.:0651;PRT;Methanopyrus kandleri>  
MAREAKDTVDLYDDRGNCVAEEVPIEVLSPMRNEAIQSIVNDIKRTVAIDLEG IENAL  
MNATVGGKGMKIPGREMDVDIVDNAEIADEIEKMIRVYEDDDTNVEPMYDGKRLL  
VQLPSERVKVMADPYSGLTQAGMAVVHAIIDVCEVDMWDANMVKAAVFG RYPQTI  
15 DYFGGNVASMLDVP MKQEGVG YALRNIMVNHIVAATRKN TMQAVCLAATLEQTAM  
FEMGDALGPFERLHLLGYAYQGLNADNMVYDIVKKHKGEGTVGTVVREVERALE  
DGVIEVKEELPSGFKVYKANDMDLWNAYAAAGLVAAMVNVNQGAAARAAQGV SATIL  
YYNDLLEYETGLPGVDFGRAEGTAVGFSFFSHSIYGGGGPGIFHGNHIVTRH SKGF  
AIPPVAAAMALDAGTQMFSPEVTSKLIGDVFG EIDFREP MKYITEAAAE EAKR
- 20 <SEQ ID No.:0652;PRT;Methanopyrus kandleri>  
MLERKIPEGAKPEVQIFPQRLLSADTTEKLLNELLERVEGIGRIVIHG PGLPKAVPFGP  
ARGKPVKHPERRPIEVHGEKIPMKVQTGQIIVEIEDEDRLDDIVEEIEKICREILPCDFE  
VQVGRFTRHKPTVTDYLFKGEEGVKKLDKRLGLVEPRARLADRVSVLKKKGED
- 25 <SEQ ID No.:0653;PRT;Methanopyrus kandleri>  
VGRETYAVDCRAAMGMGKGGS LAQRGTIAETEITEVVAVAMSPGSRHITKPVCEIT  
YALREAGIHTSVLV LNAGSGVPAEAPVQTGATMGIEPEEIERINRHEVAVIHLGNVKQ  
HIVWKARLILKHCDVPAVIVCQTPVDFEDFAEVGCRTRIVEPPEPETVGEVVEITGV  
30 IRGETVPSDKINEIVRKVRRALRYARRRSR
- <SEQ ID No.:0654;PRT;Methanopyrus kandleri>  
MAEKAQFYFGETDVAENRRKYMNP NYELKKLREIPDEDIVRLMGHREPGE EYPSV  
HPPLEEMEEPECEPIRELVEPT EGAKAGDRIRYIQFTDSVYFAPIHPYIRARMYMWRY  
35 RGVDTGSLSGRQIIEVRERDLEKIAKELLETEIFDPARSGVRGATVHGHALRLDENG  
LMFDALRRYRLNEETGEVEYVKDQVGIELDEPIPVGAPADEDDLKERTTIYRIDGTPY  
REDEELLQVVQRIHELRTL AGYRPEEAEGK
- <SEQ ID No.:0655;PRT;Methanopyrus kandleri>  
40 MSSAEELFMKALKEKFEE SPEEKYTKFYIFGGWKQSERKKEFKEWADKIVEERG V  
PHYNPDIGVPLGQRKLMSYQVSGTDV FVEGDDLHFNNAAMQQMWDDIRTVIG  
MDTAHRVLERRLGKEVTPETINEYMETLNLHALPGGAVVQEHMVEIHPGLTWDCYAK  
IITGDLELADEIDDKFLIDIEKLFPEEQAEQLIKAIGNRTYQVCRMPTIVGHVCDGATM  
YRWAAMQIAMSFICAYKIAAGEAAVSDFAFASKHAEVINMGEMLPARRARGENEPG  
45 GVPFGVLADC VQTM RKYPDDPAKVALEVIAAGAMLYDQIWLGSYMSGGVGFTQYA  
TAVYTDNILDYVYVGLEYVEDKYGIAEAEP SMDVVKDVA TEVTLYGLEQYERYPAA  
METHFGGSQRAAVCAAAAGCSTAFATGHAQAGLNGWYLSQILHKEGHGRLGFYG  
YALQDQCGAANSLSVRSDEGLPLELRGPNYPNYAMNVGHLGEYAGIVQAAHAARG  
DAFCVHPVIKVAFADENLVDFDTEPRKEFAKGALREFEPAGERDLIVPAE
- 50 <SEQ ID No.:0656;PRT;Methanopyrus kandleri>

LVGFTEIGLAAAMGALATIAGAFEDAESDVGSQSNPNSQVQLAPQMMNFHRYFNKA  
ISGEPVSYMLYGAIAGTVTWVMMTKFGLPFLAAAAGVGVGNALIHMFATTAHLGR  
MASAAEFGHPIYLDVVLSHLGPIAGFGGIATFAIVSLAYIQWALLKHPFPLPLAALWG  
5 VTVGAIGSSTGDVHYGAERLYQHYPFGGGVPAAHGNITRKAETGIRNSMDSVYFC  
AKFGNPLTGCLFGLVFFSTWAGLFGQWGAVIAMGLVTLGCLIVSNRVEKKARESY  
GTYEDVEMDEICDPV

<SEQ ID No.:0657;PRT;Methanopyrus kandleri>  
VDKLI AVLVLITLGSIMVNVGVHYVPVGGAPAAMATATGVGTGTTQLAAGSGLTGLIT  
10 AAAMSQKPFLVILWNGALGAATMMAITMLVGNFIYVYGVGCPPCSAKVDKDPITGW  
DQEAYVTPGTEGHGIPVTSFVSGILGGLLGSGGAMVYYALYKVLGMSAALAGILA  
MGFFYANAVLASYNIGGTIEGYHDPKFTRLPKAVVCSLVFGIVASVIAYYLSTLM

<SEQ ID No.:0658;PRT;Methanopyrus kandleri>  
15 LILRTLISAVAPGGEEEEVEVAVAISPLKLMTAGLICGILGTAFWVHPLIPALAVIPV  
VWVGADAVRRVAGYGLGTGVP SIGFMGLGGGSVAAILAAALSGNTVPAWAAAIGT  
VIGAVVGALLGVLD RRVIKMKIPVMERCSTEIVASGTLALICLMAAVAGDFTWSAVYS  
KVIATGLIAVLWAICAISLLHPFNACLG PSETQERTLWLGAECGSLCTVAGLATANP  
VLLAGAAWLITFWKFWELTKRDAADVWTGIVPKGE

20 <SEQ ID No.:0659;PRT;Methanopyrus kandleri>  
LAIVLIDPESQIAMDAVTGAVAEWSEDVVTLDVMPLYEKVEELEQYVNDMMRAMDP  
STTTWGTLPGREGVHETAGFLT NFAGHFVIGTMIVALVAFTLAAVYKLHALRLLGL

25 <SEQ ID No.:0660;PRT;Methanopyrus kandleri>  
VLEVPEKAEP AEGWPVVEGDYVVGDP EAPVHVVTLGSHIEEDILKAAGEDKVAIAGP  
CKTENIGIEKVIANVIANPNIRFGVLCGA EVTGHLTGQCFKAMYENGVD PDSGEIIGA  
EGAIPYLENIPEEAVERYRDQIVELVDLIDVEDVDEIVKAIEECVEKDPGAYEEGPMTI  
30 SLEEEEEEEELAEVAGMPVSAETVTVEYRINDVRVGVKSIGAMQRYMAGYLSGRTM  
GLLIGIISGMIFLFLPMVVLGGV

<SEQ ID No.:0661;PRT;Methanopyrus kandleri>  
LAEEESVPKMVAPEDDIREIHSRLDEIERRLDFVWGEVYQRF GKRIGRDIGILYGLVI  
35 GLYLCLMYILLGVAFR

<SEQ ID No.:0662;PRT;Methanopyrus kandleri>  
LFYYPGKEQKVCDICGVKVG GQPG EYPTVLAGTIFYAGHKIVKDEDKGIFDEEAAEE  
LIKMEELADETG NPMMAHIMGESEEAIIRYLDWVADVTD APIIVDSTEAEVKVAVK  
40 HAQEVGLAERVVYNSINASVEDEEIQAIKESDCNSAIVLAFNPMDASVEGRMKILTE  
GEEGVSEKGMLEISDECGIENPLIDTAYTPFGSGAGTAYKVT LAVKAKLGLPVGGAP  
HNVP SAWDWLRDFMKKLKEEGKEEWAELAHESSDWGSNVVAATLCCDYLLFGPIE  
NAPAIWPVVAMVDALIVEANEDVGVEPQVEEHPANIVR

<SEQ ID No.:0663;PRT;Methanopyrus kandleri>  
45 VLPTPGVPRLELEEEELRKHPDEAKEFVRSVLSRLLACEREIDRTLEALDGCYVEPG  
PAGNPTRGDDV LPTGKNFYSVDPRKVPTRRRAWKV GKKLAENTIERYLEEHGRYP  
ESVGIVLWASDVMRTGGEVLSQVMWLLGVRPEWDESGIVSGFEVVPLEELERPRID  
VVVRISGMFRDAFPNLVKFLDEVFEAVRELDEPEGWNFVRKHALDHRIFGDP PGAY  
GAGVNYAVHASAWDDRS DLADVVRWGGYAYGSDVYGEEAFSEFRRALSTVRVAV  
50 SVNQSSHEWDVLSCCCHFAFHGGMVAAAEHHS GERVECYHHD TDPHRVITRPIE  
EELVRLVEQKLANDEWIEAMLEHGAKGVGEWLKRVENLFGWDATTGRVPSECYEK

IEDVLERYGPRFSDENPYAVEYARERLLEAKKTGSVALADDVGRVLLHLRLDADVLV  
GLDDQRVDHGDPRDRRRVLDRTREQQVAAQRRRHVVGAPVGGLVG

<SEQ ID No.:0664;PRT;Methanopyrus kandleri>

5 LRVLCVCSGTMLKAARDVAERFSELKIDVAYQDDPIDPNRYDLIVLLKVTNVNLPTDH  
DAEVVAVPLDGSTGIQHLNTAPSSVVERAAEYLEKGGKENLENERGFESFEKLGVP  
VLNAVVSWYTDRDGWRESEGGSPADVAYGISLAELQGRIDPVLVGTKRDRGEFE  
PLPERCRLAARRAIRWARLRKDP AERRVAVVLNNGICSGGEARIGAAMGLDTFES  
10 LARLLQHMAEEGYRLDWVPRDGRELEREFFRRKAFDEFKTRVEDIVASGGAVDL  
VPLDRYLEWFEELEPEELQERMVETWGEPPGDSMVLDDHLVIAGIRTGNVFLTVQPK  
RGCAGTECNGDVCKILHDPHCPPTHYYAFYRWIRDEFRADVLLHAGTHGTLEWL  
PGKSVGLSRECWPEVCLGDLPVVYWYIVSNPSEGVQAKRRGYSTLVDHCPPPMG  
TTEAGLEELEERLEEALRDPDREDRRLFEEWEVRSGAFIEKGLHVIGEPAYDPERLS  
EFLFALCRNRLRELIAESAGLDLEELTERPEAENDLFGATNAEVLRLALDAVIRGLCEE  
15 TVSEAHHGPDRLKG

<SEQ ID No.:0665;PRT;Methanopyrus kandleri>

MGLFSKLFRRGPKPQIAESERVGTGLAVSRDYIIVASVELGNTTTKCILTATDLKEGV  
TYLIHKEVRMTRDVRPPRSGEVFGKTVWGVELTRDSVAEMVADTLKSAVKANIKI  
20 DDVHFVVRSTGVTAGFASPEEVGEMIKALADGCLKAGVPPNRMTAAMSKEQIPEPF  
REHSLIDKVYFDGAVTGVKPPAGKEVVANEMEGELVMAGIKVGAKSTKVDFRNP  
MAIDYGTTLAGRITNDELPYADTIGNLCGLAGAIMDAIARGCGEIDEEIGCALDLP  
EPDVGEKARELAEEAHEYIDIREIPANRERFGTVPVNPKAACKAGLKLGC  
SDLSRLTEIGREAYEEGGYELLFGVLDWTATLIAKRLIETALDLDLIDENTAIGIT  
25 GTTGKKPELICRMIAEEFGDYWDPEEDLVFVDDGLARGAATMARCMNCLGTPENP  
LGGNRGGGCILGLRIKHQQEGS

<SEQ ID No.:0666;PRT;Methanopyrus kandleri>

30 LLRRDAWRQARFVHPRSYREKILRSLFFALTARINQMRRLDPEEYPEDPIEGYDRFL  
EIVREYAEDPDYDSPLLLLYESLSAAYAIFLRGEPVHPPGTEFPVGVKVRRTDDCY  
CPIKERREDQPGSFCTLCPAEQDPEVVS

<SEQ ID No.:0667;PRT;Methanopyrus kandleri>

35 VRPVTVVVGSHPVGHEPTLKDRLLLEKLRRRSAYAPAIHEAVRDQTEAGVELVSDGQ  
VRGDMIEIFASHIPGMTVEDGPAVIGRVEPPRFSPVLVDYREATRVAGEVEVKAILTG  
PVTLCYSLEVRTDLYPSNDHSSLLKDVARALSAEARLLRREGASVLQVDEPILSAGV  
TSVKKVARYVNTVLKAFKGGTRVLHVCGDVTVEYLDLEENIDADVDFHEFAGHPEN  
LEVVAEGDSPIGVGVRSDDRVESLDEVVGLLEKAREAMGDRIEFVDPDCGLRKL  
PREIAKKKLEVVVRKARDRVFR  
40

<SEQ ID No.:0668;PRT;Methanopyrus kandleri>

VLTVTDIVEKIAEILERGDGRYLIMGMVQAHGLGLRSLADSVDPVEVLATIEIEGFGK  
VPHKSLVRKLAEWIEERDLDPEDLVKAGWARFELEYFEPELWRR

<SEQ ID No.:0669;PRT;Methanopyrus kandleri>

45 LVVNPSTAEAAATVILVGKKYGDVVGTAALGLFFGVLLVILTAAYVIRVKGTDVVFVSKRR  
DRLPLLTVGAIYHAIGALVMCKVGVTRPMVCLMLTYAIAAMAVAGVTRFWKISIIHAAS  
MGTVMGAIAWLGEWWAGIPWSIVTAVVCWARLKLNAHTGYQVAVGVAGGTLLTYV  
LMITLIPR  
50

<SEQ ID No.:0670;PRT;Methanopyrus kandleri>



MKAETYALLAALLWGLAPVIEKVGLRGMDPMTATLIRSLAAVAFLAVVCLAVGRSQV  
GGLKYVGYMIVGGILAGGLGLYLYLALSSGQASRIVPLSSTYPLFATLFSILALRERP  
SVETVVGILIVIGAVLVSRE

5 <SEQ ID No.:0671;PRT;Methanopyrus kandleri>  
LQFNRRVLEGEREELEIRIGSANVKRKLAMLIREGDLVLEERRELEPHHEEVVLAGY  
EEPEEGVPTERLKVLRVKRVEFVG

10 <SEQ ID No.:0672;PRT;Methanopyrus kandleri>  
MRGLIPDHMLERGRVLD SYREPVERLLSERRMPEEGWPDDVIATFLWELSRMDT  
DKDPKAARIGEREARVASRLAEESVFGFCHGVGRSGTLVDPQPKAPGASIMYALTN  
RLVTDLRLRRLGFRIEGAFVVP GATGLSIALCLSALGEGEEVIYPYAAHKSPIKAVRLA  
GFGMRVVDTEIEGDRIVDPGDVEEALERSESPA AVLSTLTFFPPRSSDPLPEIAEL  
CEEYGVPHVVNAAYGIQHEQYRDLLNRAIKRGRVDVVVSSTDKNLLTPVGGGIVYA  
15 PDEETLREVSRAYPGRASAAPVAHALISLLSLGMKGYRRLMRRQKECKALLDELLE  
DLEARDDVRVLDVDNPIASAVAVEGHDPVDLAARLYVRRVTGPRGVRADDPFGT  
SRLRGYHSNYITINAAIGVREEDVKTAVERLERELEGE

20 <SEQ ID No.:0673;PRT;Methanopyrus kandleri>  
MRYVEEFRERLERIFGDRAEDVYRYLLEGRPPTYVRVNTLKADVEEVVENLETAGV  
ELAETPLSYAFRVLSSPGPLGSSLEHVAGYLYLQDLASMPPELLDPEPPGPVIDLC  
AAPGSKTTQLAQLLGEGVVLAVDADPRRVRALVHNVNRLGCVNVIVAHADAARLR  
ISAPFLLDPGSGEGTLHRDPHALRTWTPKKPGRFARTQLRLLRAALRMLPPGGR  
LVYSTCTFSVEENELVIHEALGNDDRYRIVPSVPRWLEPHTVPGLTEWEGRELRED  
25 LRHAFRIDPASLES DGGFFVAVIERRH

30 <SEQ ID No.:0674;PRT;Methanopyrus kandleri>  
VAGDNEATEVDKRDIALLRAL EGLSRAFEWVPEDKLLERLPM DYSELATRLEKLDSL  
GLIDYRYIPTYQTYAARMKERAYDTLALWDMKKHVDYERLGTIIGEGKEATIVNAKD  
PEDEWVAIKLHRYHAPEFRRIKKTAYAAVKVRGEELRVDDHRIDVPRAKAQVEMK  
VLQRLHSGKGFVPGPRAINRHAVAMDMIEGHAPGIPAPLLAKIKVKNPEEALEVILED  
YREIVLEGHYVHGDFSEHNILVTPDGELYVVDWPQAVPIEHPSAPKLCYRDLKNVIE  
HFRRKYRIRVPDPKEVYDEIADDLQSLMEEKKEEYERHKKAAERTLERFEESVERV  
EGKREGRKAGPTEDEEDRVPGGGDGGG

35 <SEQ ID No.:0675;PRT;Methanopyrus kandleri>  
VKVVRPDRRRTRRTGFP EVVMAEGKTPEQVSEALEALLRSEGIAIASRVDPELLDDL  
EIPEDADVEYDEAGRVLVLKDPEYEPYPYRGGRVGAVAAGTSDLPYLSECATVLEAL  
GIEVHTEIDVGVAGPHRLLAAVRRLRKFRPHAVVAAAGMDGTMPVALNAMLDVPVI  
40 GLPTPVGYGLGGSGEAALLGMLQSCSPGLVVNVANGIGAAAAAVKIVRVCLEGEK  
PSKKPRNSRR

45 <SEQ ID No.:0676;PRT;Methanopyrus kandleri>  
MEKPSRNTYIPLTIVGECPECREYHRGRECPECGQDLRRPRLRPQFGGRGPHTLF  
YLEKYDWD TMKAVRRIAQALRKHHRHFGIAGMKDKRAVTSQRVTVRGVPPGVLAR  
LRIRDLKIVPMGRARRKLRPGDLWGNRFVITVRGAKVRR LPEALRTVRELGGV PNY  
YGLQRFSGSRPVTHVVGKYVLEDWEKAVKTFLTLEYPRESPEALEARRWLKEHW  
GEFKEALRRFPKFLDYERHILEHLARHPHDYINAFRR LPMWIRRMFVHAYQSYLFNR  
ILSERIARGLPVHRPVEGDVTQDGLPTVPLPGFRTELS DGPQGEIEREVLEEEGVRL  
50 ED FEIKSMPELSAGGDRKPALLRVYGLRAE AIGDDTVRFTFSLPRGGYATTVLRELL  
GSEGVYAD

<SEQ ID No.:0677;PRT;Methanopyrus kandleri>  
MVKSSHVPIVSPNDPAVVCNCTKEEYKRAKRERGKLRFAGLCEECSAAFYEY

5 <SEQ ID No.:0678;PRT;Methanopyrus kandleri>  
LSVLERIIRGSDLDREEARDLMCRIVGGELSDVEVAGILVALRCKGYTSEELVGFVD  
GMMEHAVKVPDVERLVDTAGTGGDELDTFNASTLAGLTAAAAGVPVAKHGNRSV  
TSECGSADILEALGVNIEADPDTVKRCIEEVGFGFMFAPKFHPAMKNVMPVRRKLG  
RTVFNVLGPLTNPARERVGTGQVIGVYSENLLDLVAGALAEVGVRRLVYGLDGDV  
10 ELSVTCENEVYVDDGEVTDRTVAPEDVGLDRADPKDVAGADPETSAAEARKILG  
GELPVDHPKVQMTAFNAGAALYVGEAVDSLEKGIQRALDVLEEGRALEVLEKVVDL  
SS

15 <SEQ ID No.:0679;PRT;Methanopyrus kandleri>  
LGRKEKMAEKCRKLMTEPGKIRNIGIIAHIDHGKCVAPETKICLADGRFVRADELFE  
LKERGRLVKCDESEEVYELREPVGVSSLDKDAVEIVEGKITHVWRLKADKLVEVEVK  
NGRSIRTTPEHKFLVLDPSGEIVEKRADELEIGDYIVCTQKLVHEGMSEEELKREVF  
RLGRDFFVHLPEEEAESVLELAKERGKIKALWETLEVDIEENSFYQLRKGRIRADILV  
DLAEELGLDLADLYDAVEVSYSNTKSTKPIRLPEPEDLFYLAGLMFGDGCWNQLT  
20 NGSEAIQGEVKRIASDMGLEVRVRRYEGKTARIDFPETVPRILEALFDYPRRKAHRI  
RVNDLFLTRAPLDCIAEFIRGYFDADGTVEEGRSAVSSTSVSREFLEDLQLLLQKFDV  
ASYLREGDGAYTLYVSGARSLERFPGFREPEKAELKKLMEKASSSELEKVPISGEI  
LREVRGDVPTTRMFNCYSNYEGGQVGLTKSSLEKVISTLEAVGVEGEALERLKALA  
RDDVCFLEVVRVEEVEYDGYVYDFTVEEHHNFAAEGFVHNNTLSQQLLAGAGMIS  
25 EELAGDQLVLDLDFDEMEQERGITIDANVSMVHEYEYEGEYLNILIDTPGHVDFSGDVT  
RAMRAVDGAIVVCAVEGVMPQTETVLRQALRERVVPVLYINKVDRLINELKLSPEE  
MQNRFLEIIEVNMKIEQMAPEEFKDEWKVSVEDGSAVFGSAYYGWGISFPFMEKT  
GITFKDIIIEYCQQDKQKELAQEAPVYQVLDMMVVKHLPDPVTAQEYRIEQIWPDP  
SEDGKTLRKCDPNGKLAMVVTDVRIDEHAGEVATGRVYSGTIREGQQVYLASSKKE  
30 TRVQQVGIIYMGPDRI RTDEVPAGNIAAVTGLRDWWAGETVTDPEDPIEPFEELQHF  
AEPVVTVAVEAKNTQDLPKLEILHQIAKEDPTVKVEINEETGQHLVSGMGELHLEIIA  
HRIKERGVDIKVSEPIVYREGVFGVCDDEVEGKSPNKHNFYVTVPEVEEEIVEAIE  
EGKFNPEEMSKKELEETLMEYGMDDAKAVETVKGTNFFLDKTVGLQYLNVEVME  
LLIEGFEEAMEEGPLAKEPCRGVKVSLVDAEIHEDPVHRGPAQVIPAIAKRAIYGGMLL  
35 ADTHLLEPMQYIYVTVPDYMGAVTKEIQGRRGTIEEIQQEGDTVIKKGAPVAEMF  
GFANDIRSATEGRAIWTTEHAGYERVPEEELEEQIIREIRERKGLKPEPPPKPEDYIEDY  
GG

40 <SEQ ID No.:0680;PRT;Methanopyrus kandleri>  
LEGNPYLDRLYEMKVFGKWDPTVEVVRDPGLKDYICLKPMYLPHTGGRHAKKRFA  
KAEVPIVERLINRVMRTEKNTGKKHLAYNIVKRAFDIIHERTGENPIQVLVQALENAAP  
REETTTIYGGISYHEAVDSSPQRRLDIALRLITEGAQQRAFRNPKPIEECLAEIIAAA  
RYDTECHSIRRKEEIERIAEAAR

45 <SEQ ID No.:0681;PRT;Methanopyrus kandleri>  
MPGKKSPAGEFAARKLREKRKKFRWKDERYKRRMLKLDEKADPLEGAPQARGIVL  
EKVGVEAKQPNSAIRKCVRVQLIKNGKQVTAFCPGDGAIDYIDEHDEVVIEGIGGPK  
GRAKGDIPGVRYKVVKVNDVALSELLKGKIEKPMR

50 <SEQ ID No.:0682;PRT;Methanopyrus kandleri>  
LAVKLETEQIRMIALFESLTGAHVLDCEVIDDEHNRAIFVKEGQIGLAIGKKGQNVRR  
VQEQLGMDVEVVEHSEDPEKFIRNALFPARVKSVRVTERGNKKVAIVDVPESERGR  
VIGKGGRIKKARILARRHHGIDDIIVT

<SEQ ID No.:0683;PRT;Methanopyrus kandleri>  
LQEIERQIRMAVETGDVVLGSNQTIKLLKLGKPKLVIVAANCPAEIREDIEYYAELADV  
PVFVYPGTSMDLGDVCGRPHVVASMAVLDDGESDLIATVRKAMEEGAAPS

5

<SEQ ID No.:0684;PRT;Methanopyrus kandleri>  
MNVEELLEEVCKEEDVELPDSVHREIVEKVSSEDEELKDADEETVRKVLRALVRNYK  
CRQIERGDAVGVLAAQSMCEPATQMTMRTFHLAGVAEIDITGMPALERVLSLPYH  
GPPTWVIELRLKEPYRSDREKAEGVARKIEETRFEELTEYIEVNPDECAIEIGLDEERI  
10 EEHGIDEDQLVAFVREHTGGACHLEGDVLKVTLADVESASELAEIANDLREAVVKGI  
EGVLHASVQYDEDEEEYYILVRGSPEGAPGRPPRWISQRARNRSKVAKRAYLMLQL  
MQLDEV DATRVNTNDPKIVDVLLGVEAGRNAIEQLEEVYESQGISVDPRHFMLISD  
MMSFWGELRSVRSVGGYSVMELKGSPLTKAAFEYVSRVLTETATSGDVEELRGVL  
ENIIVGKPPVGTGTVELTVDYSKFKEGEEEGES

15

<SEQ ID No.:0685;PRT;Methanopyrus kandleri>  
MTLMEEPRVQDPPKYVKRILFGILPPDKIRKMSKVEVTSPEYDEDEDGYPIEGGVMDT  
RMGVIDPGLRCRTCGQPAGRCPGHFGHIELARVLPYRPAERIKDVL RATCPECGR  
VKLPEDEIESYLREVREGIRPVKSVAEEVIDRAEKRESCPHCGAESRKITYQKPTTIM  
20 MDDERLWVPDIRAWLEKIPDEDVEILGFHPERARPEWAVLTVLPVPPVTMRPSIILET  
GERAEDDLTHKLVDIVRVNLRLKESLEAGAPEPIEDQWDLQYHVTTYIDNEIGGV  
VARHRTGGKPLKGIVQRLKGKEGRFRQNLAKRVNFSARSVITPDPELDPFTLGVP  
EAI AKELTPERVTEWNIDRLRLKVLNGPNKHPGANYVVKRDGSRITDENKEKLA  
EDLEPGDVVERHLMGDGPMFNRQPTLHIQSELGFRVRVMPGKTFRLPAACYMGV  
25 GFNADFDGDEMNLHVPQSEEARAEVRELMGCYVYHLWPPKNGHEDVRNSPIHEAI  
VGIHLLSRAWIPLREAYQLLEEVKKEGDWFEPTVVKLKPEAKYRRGFEEIHELEFV  
CGQPREGEPLVTGRQLLSVFLPDWLD RVELENACPDDEEHGKVVEIKGRIVRGFL  
DEKTVHIGIMTEIVHRYAAREVARGESYPWFKA AETTLRAMDKIGRLGLRFVTRYGF  
TLGIDEFEDIYERFRDEVERLCDEAAKKAKEI IERGERRLQEEHETCNRSRIERGE  
30 MLERNIESEVMAILNQPRVETERLLKKHRDLFNPAIMPESGARG SITNIARMALIGG  
QQAVMGERPHRAKHNTHEHIMEKIVNYSYTD RVT PHFEKSLIPGVKEGGFVRSGFFE  
GLDMVEYFLHAMSGREGLIDKGFR TADSGYLHRRYVTTALDLIVDSGGRVRDSANN  
VIQLTYGEDGVDPAKKWGLNLDVEKALKV VKEVVLEEERRVRGGAG

35

<SEQ ID No.:0686;PRT;Methanopyrus kandleri>  
VETRVDAVEHV LKGPEREEDRTPVYLN GR LIGYVEDPEEFVEKVREL RREGVLHP  
RVNAAYHEDLNEVHVNC DRGRVVRPLLVEDGEVKLTEEHLEKLREGEISWKDLEE  
EGVIEFLDAEEEEENALIAQSLEEFYSMPKEERKKYTHVELDPAAIFGTCCSCIPWPES  
NSAPRNTMGTMTRQALGFYAANHPIRMESRGHLLYYPHRPLVKTRGTEAFDYDE  
40 RPAGQNMIVAVLTYEGYNMEDAIIMNESAIERGLARSFFFKTFEDEARTYPGGMKDK  
FCIPEKEVRGYRSEDAYKHLGEDGLAEVGERVEGRDVIIGKTSPPRFLEEF RPEELP  
AEERRESSTAIRHTDSGIVDSVIITETSDGHKL VKVRIRDERVPELGDKFSSRHGQKG  
VIGMIVPEEDMPFTEDGITPDILNPHALPSRETMAHILETLAGKAAALSGKRIDGSAF  
TSNPKEAYEEIKMLRELGFPTGKEV MYDGR TGQKLEAEVFIGVCLYRKLYHMYK  
45 DKYHARSRGPVQVLTRQPTEGRAREGGLRFGEMERDDLVAWGASLFLKERLLDES  
DKYEAYICPNCGELCYVHAATGKTICPICGEVRADRVEMSYAFKILLDELKSFCMDA  
VLEVGSLSEREEGEEE

50

<SEQ ID No.:0687;PRT;Methanopyrus kandleri>  
LSEEDYLALLEGYLRRNEELLGDVKTHPLIAHHFLSYHWLIDEG LQQLIEQMEPIEPE  
VEGASYRIEFERIEVGEPSSIEPDGARRKIYPMEARLRNMLYSAPLYAEIVMYEDGE  
EVERDNVYVGELPVMVRSKVCNTYGLSEEELIEVGEDPKDPGGYFIINGSERVLM SL

EDIAPNRRVNEKIRERGVLDVRSRVYSRGERYRGPVDVIDRKGRLLVIDMPAVYRK  
FPVVILLRALGLTEEEIMEGVGPEFATIMAEQMRVLVKEEIGSQEDALEYIGRLSRPD  
ESREERIKRGKEVLAKYFLPHIAEVDDDDDEKLKEVFRKKADEVLMKVVREVLELKY  
RRVKVKSVRDRDHYANKRIKLAGDLLYEAYEYAFQQLAREMRYQFERAYSRRGREGP  
5 TIRYIVRPDKVTDHIRSCMSTGTWRTGHYRPRGTGVSQILERYTWMSTMSHLRRIRA  
ATELGVGKWSIPKEARYLHPTMHGRLLCPNETPEGANCGAIKNLALYAEVVHKDADE  
DEVIEILEEIGLETE

<SEQ ID No.:0688;PRT;Methanopyrus kandleri>

10 MAERLDPDVVLNHLVLPKHEVIDDEEEIEKILEELGVEKDDLPRHTNDPVVVALSEK  
LGKRIKPGSLVKIVRDSPTAGKTVVYRVVTPNPE

<SEQ ID No.:0689;PRT;Methanopyrus kandleri>

15 LYRDFREFRPDLEFRACVACGECAAVCPAGSLELRKGPVEAFCATCRLCEDVEVS  
RLPSDVASLLCPAFVQRIARLLPHPWIRESRGTGCGLCVERCPVEALRLEEGRV  
VEGDCELCGTCDICPVVDCIIPPAAVREVFLGFSEASCVDGCLCVETCPFGWGE  
GAWRSGWIRTWC

<SEQ ID No.:0690;PRT;Methanopyrus kandleri>

20 MIERVKIENLRSHSSTEIEFREGINVLVGPNGAGKTTVLEAITLALFPRTFRSYDHMIR  
EGERRAVVEVFWGADGHKYKVRREFYRGGGQRNPRLYREEGDGWKVVASGRA  
EDVDREVMNALGGVDRDVFREAVYIRQGEIAKLVEATREERKRIVDRTLGLAEFKKA  
REQAHELLRVAEAKLETFRERVRDLKGSKKELKRVERELEELKREVKELEPEVEELK  
ERLNLREAKREFERLEGEELRLLENKIESLKGRRDDLRKLVEEGKEAERELQRLGDV  
25 PSKVRELENEEAELRRRIEELRNLLDRLSLNRNLESAAAAELEGVKRELEELKDEAG  
VDPERLVEFKDKIVEASERLRLRREEELKRKLEKVSDELSELGDREETLQSEYEEL  
QERLDEIQGELKEIRVKEKELLERIESLREAECECPVCLRKLPREAEKLLRDAEKEL  
ERLQGREEDLRKERRELKDRLESVRRELEGTKERMWRLRERREELERELEEIEELK  
EELADLSRELGVEEDRLPELRLDRAVRAESLLRDLERRRGDVLRLKELEERTLDRCEK  
30 VIGRTPSGVEDVEEELRRLEEERDHVGQKLREAEGELERYHNLEEKVKRAREARKE  
LKRIERDLEDAKGRLEQVERNLEGLRERYGSEDRLEEELESVEKKYERVRDKLSEV  
KGRLNGMEKRREELKKQVRKYREAKERKERLERVVEVLSLCKEVFRYSRDVAREK  
VLPVEREASKILQDLSDRYGSLRIEDDGAVIRVSVPGGHFIEADRMSSGGEKIIIGLAL  
RLALAMVGSSFAFIMLDEPTVHLDAEHRERLAQALRELDLGKGRVRQAIVVTHDEE  
35 LEDAADELWRIENRAGESRVERYSG

<SEQ ID No.:0691;PRT;Methanopyrus kandleri>

40 LRMAHVADVHLGHALMNLSREEAVMETFERLMEEVRECSVDVLVIAGDLFEHARP  
KTEALYLAVEKLSELKEDGVEIVATAGNHEIRRRKGAVSPISVLERMGLVRHLYYSE  
RRPERHRYTATFDGVRVTFHGLQYLPKNSFVERAKVIRAKYRPDPEADVNVAFHQ  
ALPGTIPDESEIVEPAYFPEGHDYYAMGHVHVPSSREEKIHGSPAPYPGSPEPLTFLE  
VKDERGAHKRRGFFLVEFDRGGLVEYEFVEVEWSRELSVVEVSGERWEEELRRR  
VRRGQIVKVAKDTGASPEEVEKVAIEAGADRCVVELRERRREVEEGDETEGPLDL  
EGIIREGVKRARAATLTRVDVPDDVVEVALEILRGVREDNPPDLGDVEGIVAGEPP  
45 SEGSEESSEEPESDGEEVGLVEEVKVESRGTSSEGMSRAGSKLGSSGRPSLDR  
WIG

<SEQ ID No.:0692;PRT;Methanopyrus kandleri>

50 VRRVERKVVGYYVESPSVREFTFVSRDAEDVGVDYVVVREPDSGDRELLGRVE  
DVRRDVHEGIKGEIAKASMVSGRPVPELDWTVVARVEVLGALEDGRLRDPRMPAR  
PTDAVYRLPESELEELFSKGEVFLGRLLKDSRARVFLGLNELITLHCAVLGMTGSGKS  
YTVGVLIEMARHDIPVVVIDPHGEYTSREPSHDRERLERWGLEPEGLDDVEVFAP

PHSEGVKDYPITIDTTKLEVDDFEVLAPELSKRKAAPQVLEEVVKELQRRYRETGEK  
YSLEDVVEELDAQAKRARASGDVVQYQAARAVLRDLRPLLRYGIFDMAESPDLRRH  
VRPGRVLVLNLRGVPDRAQQIVVTHFLRRLFELRQRDEIPPVFVLEEAHNFAPAGE  
ERSSSKTALSVRDFAREGRKFLAGLCVVSQRPGRVDTTVLSQCNTMIVLRTANPD  
5 DLENIRKSGEGITREALERIKGLPTGTAFVTGSAIRIPAFVDVRPRMTRHGGETPDVR  
EIVERWKEDDAEEDLDLGI

<SEQ ID No.:0693;PRT;Methanopyrus kandleri>

10 LSGELDRFLERGRVRRGRDYGRILLEDISRRLRELAEDVINVYRRVSPGRNPVLRRLV  
LEVVAERKREVEPEHPDPEVTFGVDGGEGMREYQGVVLYVTRAAWSEADVLSS  
WDFGVLSRTRTPQMRVAARRVKLESDVATRAVERGGEVVMVDGPIVPHDLKGAN  
EDSPNRRDYWGRILDARRTMLEVCEEEGAVVMGIVEDCKAKHLLRDVRDELGEDL  
PLKALPNDPVALSRELDGGPVLEVGERTHAFELPDEDYPVVREFEEATGYSIFTFYV  
15 RTTRYSPVVRVEIPEFVDPDEAAGIVLGTSEYGGYGIPLPLVMADEFKVGSRSLVD  
WIEEEVLTELASDGRFDVIFTVFRRLRRESRPKRRSSAEAREIHLRHGGEEGA

<SEQ ID No.:0694;PRT;Methanopyrus kandleri>

20 MGARTFGQVSVEFVLLSIIVLTAAFIAGRYMGPEYEWYCVKKAVSDAVAKTREQVAV  
GVTYRVGDQVEISGNLSVVRQVNDRIEYELKYSQDNPAAGVVDLLRRNVLLQVY  
VALYGRP KSVSEISNPVKGSWANYQVEVSGGESIKVVVERTKE

<SEQ ID No.:0695;PRT;Methanopyrus kandleri>

25 LRVRSWFSATPSGQVTIEFAALLLIMLVLSAYFTYSVVGTFGLGVSDVMALIEARYIAN  
YVANAIAGTISWLPDWQSTANQIHLPEKIGNSEYYLKVRVKGEPPGGEIVVILRLGG  
RFEKKVGV TASVPILVGWPSGGWPPRTPGVVLIDPRTVDDPVPTPVTEWPPGDEW  
WVSTSGKPFEFGLYVIPPGG

<SEQ ID No.:0696;PRT;Methanopyrus kandleri>

30 LFMSFSRQASLEYLLVLLIGVTAVGMAMAFVKEGMYGSGGVEEAASALEAKAMAE  
QLARVLDKAAACDVGTRFTVRIKGRPGTQGSYTVSVEPTGQHDEYYVIVEGNVVK  
GVAKFYSFGKDVVENVTVPGVVEVSVVEGPKLVLRNA

<SEQ ID No.:0697;PRT;Methanopyrus kandleri>

35 VGLYHKLPLLKERGQVFTLDAMAALLLSLVLSALDYIHMVSWPTISPRQEVSSIAV  
VQPVKWGWVATGVYRGELPHLEVKEIRVTDWNVNGNKWTAKVDVSDKLPDPKKIV  
MAFLVLMVGDNHVVDAYDPNDKDLGVYEVNGDENGERTVFTVPIDWRGNIGWW  
FPYNYNGRIWEKTLVDLTVDDRGNPLLVNKTSDDNIRVRIGVKIRGYWGRQYRDKT  
RIVLV LAPKQFDVAVQVWRPDGPQIGPQPYDDRDGKTGIPVKGSLATDLSRNKNPD  
PVTNFADWYGEDVDKDRLENPDENPVITVKDLVMRIGRVFGNWRPWTPVGTGPYR  
40 EYYDKSDGTVHKLEDAKDPNGDGADGIVLTRHGAQIDDSYHLFAAYVMMPRTFSSV  
CPLDAPILALTTQRNGPPEFVYANVRTPQDIKIDWANVDES LGASNIGTNTTYRW  
NKTEDLDFYNDELKYYKYDDWYSRSIGIPADYLYGASGYSHLVVIDPEAQWPITPA  
GGLIGTSSTVEQVLRTHSVLYAYLRPNRSHGVHTHFN YDTHGYWYFKFPGGIP  
VQGGPQPRIVAIWIKAPHWLYQWAPWADSVSASLG FANTRFNNVPGDGRSDELD  
45 MTINIQRPDPMP SVIKNWAVQDVYMFNLDDEDPDNFWIYIDDEEVWPDDWVPPSIE  
DLKSLSGGKIATPGHTIRVREYEQPSPEAVEIGPFNVLVLYKGTMYLYLPRLKRSKE  
DAVNALRQEFERLGIDPDDPRVRITVAPSRGYDKPHKFRLVAWQEERVLYTPEYLR  
RLSTEALSQLQSSGALS YVAMEWEYYQDTGDATKLRRALQSLQPLLSSVLGVHFKL  
50 EVWDEKNKQWVTLLTDQGPAI

<SEQ ID No.:0698;PRT;Methanopyrus kandleri>

MIPRGERGFLFTP AVALALALLLSVSYLSYRGRESGYLIRCEYIKPVINEAILSMT HQ  
 QLSRAVYLG VDFLNGTELP GGEEKNGYRYGRIAVHAGGTNIEWVASPTG LLAPYDI  
 VDVGRLKGDYDSYRTVIESLRYYIDYELAKLAVDVHDSIKQTQGA EVWIVPRCYVGD  
 GS LYWDTSDPEHPKVRLSWYGRSDPKDVSRTPIV PDAHDPFTIYVHLDIYLIAQVPG  
 5 WEQFNLHLGQTTVQASIQGYAPSGNENKAVFDPLPIWAYYVSKDRWGDG PLRFKP  
 MIVMGNYQVAVGQGGSIGGERVGGSDVIRFY SAYLNEVNGDGRNSEADEDKLRLA  
 HVL SIPGKMLPWDDTKLLNENEVDGETESQWVILPYFPTRENV LGDDVGRPPNFIE  
 RAAGILYVLP SNRVSVVDGIEDPDVDVIQRCEAGMETLIPALPAEEVDVWAHGPFGT  
 10 VDWMAMWMEVLASRSGKLRGVINGVRASEFGPPER YDDRGE PVRLFRLYGFNSND  
 PVVRQINSLLAGIGLQLATDADRRKGFALPGADILKWFLLP GTNTDMVLKNGRVIRV  
 WP

<SEQ ID No.:0699;PRT;Methanopyrus kandleri>  
 LRGQITVDALAAGLISAIILLVTDVARVVT AHGITS LR TYELYASVDRFAASLTSPSW  
 15 VGANLTSYDIVWLWSEPLQWTWGGAPLRTGVRMYLA VDAYKWTRYSEGGSLDSP I  
 KVNDGRMMADLVFPNDLNVSGEAVVKS YDVMLVKRGDTWVYDENLPQVWGNT  
 VSYSGNVP GVKVWVTVSGDGLYGWVRWLHKRYNQLIQSGLSEEEAYKELAREAI  
 SMNSGGNRIVFYSSSGWATDDPVELVRRIVAEGEGSGLSLTIIAIGGRPFTVTLSGS  
 20 ENEIFWNQWTAGLFPVKLRVGVTAG

<SEQ ID No.:0700;PRT;Methanopyrus kandleri>  
 VSVEWTILLMTVIAAVFALGIALNASNSGFVSTT GSGWAAGMKELGSEVVRRAATP

<SEQ ID No.:0701;PRT;Methanopyrus kandleri>  
 25 VSGQANIELLVLGVLVA AVAIMAAVIGYYMPLKKSSSGLGDVARAQNEKISNVCH EL  
 ATKWM

<SEQ ID No.:0702;PRT;Methanopyrus kandleri>  
 30 MALGVRGQGGVEYLLIIAIVAGCAIAVGVIAYYLPISGGKQGLKDVGSAVSGGFERFA  
 SSAKKL

<SEQ ID No.:0703;PRT;Methanopyrus kandleri>  
 MDVGFLAGLAVATVAAITDLKWGIVPNRLTYPAIVAGAIYAAVIDPSHLGYALLDAGV  
 35 AFGVTLVNLVGLVGGGDVKLLPSLTLFLHRGDRITTGIDVLFNSILLYAPFALLYLT V  
 STALDRGRPFLKELCLNTTILVLASLIAGGVATILGTVISSVVGILLILAVWKVARSYES  
 KLKIVLPALVVPVAVLLNLRASPIAVLWEVGIAVALSTAFFTYRWAGKERNVEELREGE  
 IPLEIVRTEEGTERVGR LKGALLVATGRAEPVVVPSGDGFTEEELEKLKRLGIDRIR  
 VGHTTFFAPAIAAGYVVTYMLQGSPLSWLWG

<SEQ ID No.:0704;PRT;Methanopyrus kandleri>  
 40 VKLVITVDLFGGERGHHRLGALPRDAHLTVFTDYLSILEMRDALEAVDWDIHCTTYS D  
 VPLTYVPEEDAQAHIELSSEFGECFRAPALAVNKALLRKLPELGFDADSSGWSRKG  
 RVGRLYEVEAPIVCDVMDRKFLNKVLSRLDSYDVVVL RSGSEIPGNRHF KIVDKIAS  
 45 SLSVAPLSEVLEEADGRVRAKFNDRGILTEREHL LTTALSEVWRLHSELSEEVGDRE  
 LILAH LASESFRNPQRVLT VCKRFAEELGSEYTERLARVSKRPVIGALRKL SRRFQIE  
 MEEEDERLRVQELKRRVEAIDRGIRMLAQDRPIEGWNEILSVLSG

<SEQ ID No.:0705;PRT;Methanopyrus kandleri>  
 50 MLRNIGPVIRLIVLILYPLALPLARILVIRMSPEYLR RMDYLLQVSNIDVPYEIYLSASLIY  
 VLIGMSISGPLIPKLGSTAFLLAVMPLYLLIHPRIVQSLRIKDIEENLPDALRQMVEELR  
 AGLSIFETIRNVAESDYGELSREFRIVVRDMDTGKTFEEAILDMAERVNSELLTRAVR  
 LTVRISMSGGALADVLEAVENDIREVRRIELERKAITTMPCLALALGGLISGLPVGVSI

GAVIGVAMMERMGPTYAMLPMYLQAKDPLASYPLVLGLLSGMAIGIIRYGNMKRGL  
VFGLPLGAAAAGVYLAIVSVMPSFLAAGGM

<SEQ ID No.:0706;PRT;Methanopyrus kandleri>  
5 LSLPSFSGLAEKRESTSRMLGGRLESSLTAKVRAARHAVRGEQGEDVEKIKRIVLG  
IEEEGERDRTAEEINERLRRLCRERANVLETLIEMVQSLSPTLGNRFRGLAPDREVL  
QKAGLRISPAAFATFMIISGLMGVLTSPVPAALFPLPLPLKVLGPIMSFLGMVPRM  
MVTILIRRREGEIARQLPYAIRQMATEVSAGLSLIESMKSESSESDYGALSEEFEVIREI  
10 NSGTPINVALQRMANRWNV DGLRTMVRFITQAMESGANIAKTLMTLADEIAHEL RQ  
RYREYGHKLQALAFPYIMLT LVIPTLVTVAMLLAANLSGAFLVPPPLFGPMIAGMVG V  
MAGIFLFIFKSAEPKV

<SEQ ID No.:0707;PRT;Methanopyrus kandleri>  
15 VVWTVPRKRNIKDLIGGLEEDDLLRDILGEKEEESKSESPETVEETA EASGEHYEAE  
ESKISPLSSEKAAEVLEAHELAEREGWEGKILCDDNIRRIVEYPDQPVPVYISKEYEQ  
YYNFERIRTQVLKRLGSQAPPYARDDEEFRKVLDEIKDILSMNIDFDPTEYATLKERE  
KAFVELVKENFDAVLEEYPELEVVKDDLALHLLMYEMVGYKEIHPLLKDDNLEEIMVV  
PEVVLGGTAKHCFIYVYDRDHGMCLCNFRVTSRSIRTVIERISRESGRRIDQENPLL  
20 DAHLDPGSRVNATIPPVSPDGPTLTIRKFREDPLTITDIKFGTMSYEAAYLWLAVEY  
GANILIAGGTGSGKTTTLNCLCIFIPPEERVITIEDTLELQLPHEHWRVRLTTKPPNVEG  
RGEITMDDLKNTLRQRPDRIIVGEVRGPEARTLFTAMNTGHDGCMGTLHANTARE  
TITRLTNEPMNVPKIMIPALDIIVMQNRFLQRGSGSIRRITEISEIAGMEGDTVQLNTVF  
EWKPETDEVTSTEVPSMVFKKIQEKTGMSMDEILHEIEIRKILKYLVDNNIRHVREV  
25 GEFIEFYKNRESVLEKVGISGY

<SEQ ID No.:0708;PRT;Methanopyrus kandleri>  
LAEDLPPEILKAVEEYYNRPEIVEVVESLAKPKSIEDLGLPEEYIENLVKVIADRGPV  
EGREIYEVTRIPPILEEIVDELQDRKLVGHTGGGPMFQNTTFDVT PKGRELAANIMS  
EDPYIGVCPVPYDMYQEVVGDQVEGRYPYIEPEEVYEFHDFVIGAEAAKRTYYLAA  
30 TSGRGLVVFPGPGTGKTFTLSRMAKLLPPIVIPKAVYVAGSVLQLYDPDFHEPRPRR  
EQPGDERWVKIHAPFVFTGAELTDDLQGRYDAEKGVYEVPPHVKAHGGVFLVDD  
VGRQRDSHAILNRLIVPMENKKDIVHVGGTAVEVFCDFIAAFSTNLPITVFEAHLRR  
APLFVHLSHPPLEEAVNLFRKRLDEMGEETYTEDALETYRRAFTPEEEGGWGLKPTF  
AYARDIAQLAQAIRIQEGKDVIDGEIVEKALRKHIVLTQRKGADLDKFGTEETEVPVT  
35 TIVVKGVTEEDVNEIEKIPGVRTVSPMGTDVYVDLEGTTPTRFISLLREWGIETDVE  
VVGTFRASVLAEATTMEELMEGAEEEEETTEGVGVEPETGKEERETEIEEETEDIED  
VDDLKDLLEL

<SEQ ID No.:0709;PRT;Methanopyrus kandleri>  
40 LRAPYSGRGKPSREELGMIIARIRGREYRFLTAPGVFSWRRIDPGTQLLAENMDLEG  
VHSVLDLGCYGVLGIVAAKELGEGHVMTDVNRRRAIWLANENRRRLNDVEDITEVR  
EGSLYDPVEDEEFDRIVSNPPIREGLDLVLRIVREAPNHLTEDGELWLWVRRKMGSK  
RILSEMRTVFGSAEVAARGGGYWVLRAPG

<SEQ ID No.:0710;PRT;Methanopyrus kandleri>  
45 VLKDAYTADVTPERDGEVRLAGWVHEVRDLGGIKFVLLRDRTGIVQLTLPKQKVP  
KETFEKVPKLTKE SVIRVEGT VQANEKAPGGVEVIPQRIEVLSESDTHLPLDPTGKV  
DADLDRDLARVLDLRREEPQAIFKIRNVTTAIREFLEERGFIHVHTPKIIASATEGG  
TELPVVYFERDAYLAQSPQLYKQMLMAAGFERVYEIGPIFRAEEHNTRRHLNEAIS  
50 VDIEMSFIESEEDVMRVLEELLAHVFRKVREECEKELEALDRELPELETPFERITYEE  
TLDLLSEHGIEVEWGEDLPTEAERKLGEIFEPPFITWPRETRPFYTMADDEVT



AFDLMYQGLELASGAQREHRYDVLVRQIEEQGLSPEDFRHYLEAFKYGMPPHGGW  
GLGLERTLMTITGAENIREVTLFPRDRKRLHP

<SEQ ID No.:0711;PRT;Methanopyrus kandleri>

5 MRLLVRPEEEELERVLRSEMDVTEVLPDVERIFEDVVERGDEALLEYTERFDGVK  
LEAEDLRVSEDDFEVARELVDERTVEALEEAAHRIEFHRKTLPRVDRITFDVEGTE  
CGLTLRPIPRVGCYVPGGRAAYPSTALMTVIPARVAGCREVVCTPPADNDVRASP  
EVLVAVEIAGADAVYRVGGAQAIAALAAGTETVLRVDKIVGPGNVYVTAAKLLAYS  
10 GLTDVDMPPAGPSEVFVIADDSANPDWLARDLIAQAEHDPHAAAVLATDSEEIARAVK  
ERVEELLDAGIEREEIVLKALDRNGWIVVLDSEECVRLANRYAPEHLQLCVENPEE  
LLQDVENAGAVFVGHLTAVPFGDYATGPNHVLPTGGFARARGALGTWDFVKIPIQ  
RLREGDVERLAPIVEELAEREGLPNHAEAVRARRS

<SEQ ID No.:0712;PRT;Methanopyrus kandleri>

15 VKIPPDHPRAEALKIRERLVRGFEDGYVVPQGLIAQGRGEVFDYLIGEKTIPPAREAI  
KAAAAAFKLAEHPVISVNGNTAALCPEDLVELSEVTGAPLEVNLFHRTEDRVEKIAET  
LREAGADRVLGADPEHLVRLPNLSSHRAVDDRGIIYRADVVLVPLEDGDRTALKE  
LGKTVAIDLNPLSRTARDADITVDNVVRCVRKITREYERMDPDRAKGVLREYDNG  
RVLARVLDHIRERLRLVLADEAAGAT

<SEQ ID No.:0713;PRT;Methanopyrus kandleri>

20 LVNVVVCVTGSVAAYRAPDVCRELVRRGHRVRVASEEALRFVGKDALGFAAEEVI  
FRLTSRAEHVELAEWADVAVVPATLNTLAKIARGVADAPVPLTAVTSLGAGKRLVV  
APAMSLHMYRSPAREILRQLEDMGVTVVGPIIEGKAKLASIEEIVEAVEGELSGF  
25 RVLVTGGPTMEPLDDVRVITNRSSGRTACEICRELARGAEVVFVHGPLRVDPPPM  
DERVEVETTREMEEVVKRIDDVDAIVMAAAPSDFRPAERADGKLDSRREHEIRLIP  
TEKIVREVFPDFDGVVAFKLDPEPVEGARLLDEVPCELVVANPPETAGAEGSEW  
WILDGDGEVIERVKGDKRELARKLVDALSKLLRGDRG

<SEQ ID No.:0714;PRT;Methanopyrus kandleri>

30 LILGGLKLELPICEVCAKTGLLCPGCEERLEQGEITETDVEVSKKLVELKEDHPSLED  
VALLRTIDTGNLVVLVTKQGMAGKLIGKRGRISRALSDHLGKKVRVVEEVEDPKDVR  
QLRKLQDLILPARLLSVNVVYEPDGERYKAVIHHRDRHRVPADTEELEKAVKELTG  
MEVEVTFG

<SEQ ID No.:0715;PRT;Methanopyrus kandleri>

35 MAEEENVVYVGSKPVMNYVLACITQFNEGANEVRIKARGRAISRAVDVAEIVRNRF  
MPEVEVKDIKIGTEETEEDTVNVSTIEIVLEKPV

<SEQ ID No.:0716;PRT;Methanopyrus kandleri>

40 LDFQPLELELERGHSLTTRPYGFPETSFGGTRTVHHLVPAVLIMFFAVTAPVASLEP  
PSDPYEQWREELRTMFSDYFPHFDTSTPGDVKLTGAKVCCACEVTTRQHVEVQPG  
VEAEGVLVATSTKSGADIWFWNWNGWARKLKSQGETPTDAAYAPSNDGGIVLVFV  
SPSSDGVLLHAFRLSFVTYLNLPGSEALYVPELEADNKYAIRAPGKVGRIRVLHVG  
45 EYSGNVERPLFLVLYTVSVQGKPVVEYGADLYSALVRVDPSNLSLEVVPGSVISDFQ  
YVTTFDADVVKVPGYCEYRLKDRRILANWVAVAYAKQWKECGVYLTLLGYSPVDDT  
YLPAAHTRLSDACSPLIGDLLLLAHTTSLSDGTVFLTAWTDGRDPISYLDLLNPSPT  
DEVIFDGDVWCQPAVLEICANPRILASIRNKPAIVPKGSKPVSLIGIKGLEDSAMFW  
LDVVEDSGIRSFPIPVAVEREGDTVYATPCVLAVAVRTTEEKESEGKSSEELLWVLG  
50 TSDTRARDPKFVPPNVVLPDDEFNDIRLWEPWASTLTITAEGVKSVVVPTGKTMTPP  
GVPTGEGYVIGKMVMVIYQTEQGTEQRFALPSVPIACLRSLTLIGGYLPVIPLRYRM  
LKIAVNISGPTITSSEEVHYRVQLSNLPTIREGLSVVIVVSRRNQVVGAAVLKLSEPDH

PVVEGDLEGVEVKSGDISPVIDVWVKTGGSGFYTVVEFFADALGWLMGEEAVTTTT  
 VRRVRTPSQAPSSGPTEYIPPLGLGVATPSRESESHPGVALPVPVPVRVRIRRTERR  
 MTGLKSPITRASRARSRS

5 <SEQ ID No.:0717;PRT;Methanopyrus kandleri>  
 MSPFELEFEGLKVQIGSIEGFEPREGGGLPCPTVSDLADWDRKLFARYRVIAFPICD  
 MCCMCTYGRCNLAEGRRGACGIDIRSNTARFTALKTCIGAACHAAHARHLVEYILEK  
 LGDVEIDLGSEVDVMTPIFETLVGFKPKTVSDLEKGLEYIERELTKVLSSVHVQGEM  
 DPHDYESKALHAGMIDNLALAIADVAQIAAFDMPKGEAPLVEFGPFAADDSKPCILLV  
 10 GHNVAPGTEVL DYLEERGLDEEVEVLGICCTAWDVSRVDDRSKVIGPLSRQLHYVR  
 MGIADVVLDEQCIRADIVEEANEVGSRVIA TRDLVMAGLPDVTDEPTEKIIKMOVSG  
 EWMGVFIEDLEKAAEVAVEVAIRVHERRKKEIPQDPKPKLQKEAKRCLGCGDCERV  
 CPNDLPIVEAMERAANGDFEGLADLFDRCVGCARCESECPTKLRVMNMIEDAWRL  
 RTKEEKYKVRTGRGPIKDVEIRQVGGPIVMGDIPGVVAFVACPNYPDDVKQVGKMOV  
 15 EELLERNYIVLTSGCTAMALGMYTDEDGKTLYEKYEDRFDAGCLVNTGSCVSNAIL  
 GACIKIAAFAKKPLKGNFKEIADYILNRIGACGVLTGMSQKALAISTGFTRWGIPIVY  
 GPAGLKYQTLYIGDLGDWTVYDARTGKECKEYCPHILKYAAEDWREALVQAVKLC  
 IRPNDTPQGRQTKLQNYIELYKEFYNELPPDLPLYVRDKNDVPITLRDEVMEYLEEV  
 GWKPRKGITEPTLLEENVRG

20 <SEQ ID No.:0718;PRT;Methanopyrus kandleri>  
 LPLPRDPTLIYTDKAEVARAPVLKMFRRANDSLMIVGPRAVEDEEWRELLMKLREE  
 FRMSAVCTAPYKGNLGRKMGIVEAATLLQRDAPVLGVHPDLVVFTGSRTDVTDRV  
 LQGLRHARPDLVKVSLNPEYCP SADYSLPTVKRDQFLQELKALVGI

25 <SEQ ID No.:0719;PRT;Methanopyrus kandleri>  
 LGIEWEGVKVEIGELVVEGDSESEMEGPTRRELLPWDRTLASVYDLAVPGDSEEE  
 RREVARTIVTLCCEGTAGLISTARLVVELLRQTGENLDPGFDAETPLPLYETLLGSSP  
 ECADDLEAGLSYAERELTSSVSELLRSHSLKGYESVAMHAGAIGLLAMEIADATPST  
 30 LMEVTESEEVFEIGTDDLPRRPTVLLVGHLP LLGHIITEELGTLARQVELVGLTHTAW  
 PNREDHVRVVGPLSMYHEYLSSGFADVVVDGACPGEDVIEAAREGGSKLVATVG  
 ARVADLLDVTDPVEEAVEVLVTEEDAVYVEEPIKAVEIAAWAALRVEGSRDRREPP  
 RRAFRVGPPTRLTDVVIRNVGVPVWAGNIPGIVVLVSCPEKSADVEEPAKIAEVLLE  
 GYLVLVPGCLAVALGSYLDGDKTLERYPD TLLNTGPCTSAHLVGACIRVGVIFG  
 35 KLPIRGEFVRVADYVLNRVGACVIAWGGGEYSEHLVSAAYGVTRWGIPVVLGPDPEA  
 GSLLVEKNPKVIDACSGEEVEDPTPEHLRCVSDWKEAAITAARLCMRPNDTPEGR  
 QNKVESYVELYRELYGELPPDLDLLIRDESDIPVTLRSEIRELLEETGWTPRSRASDP  
 TLLPEG

40 <SEQ ID No.:0720;PRT;Methanopyrus kandleri>  
 LTSLADLPVDVSPRHEGERIRSGDMYVELAGPKSFGAELFKVVDPEIEPDKVEVIG  
 PDIDEMEEGGRYPFAIYVKAAGEELEEDVEGLERRIHEFCNYVEGFMHLNQRDQI  
 WCRVSKNVTEKGRLEHLGIALRELYKEEFGNVIDSVEVTIMTDEEKVEEFLEYARR  
 VYKKRDERAKGLSEEDVNEFYVCLMCQSFPATHVCVITPDRPSLCGSITWHDAKAA  
 45 YKIDPEGPIFPIEKGECLDPEAGEYEGVNEAVKEHSQGTVERVYLHSCLEYPHTSCG  
 CFQAVVFIPEVDGFGIVDREYPGETPIGLPFSTMAGEASGGEQQPGFVGVSYGYM  
 ESDKFLQYDGGWERVWMPKALKERMKHAIPDELYDKIATEEDATTVEELREFLEK  
 VEHVVERWAEEEEEEEEKAPEEEAPAEPTMEVKELPIAPGGGLNVKIVLKNKIY  
 AEKVIKRADREDKS

50 <SEQ ID No.:0721;PRT;Methanopyrus kandleri>

5 LIIAFTGKGGTGKTLAALTVELELLDRHPDADLLVVDADPDANMPDVLGVEVDTTLGE  
VREHFKEIEGGELPPGFDKQAYMEYLVMTALQESDDYDLLVMGRSEGKGCYCAV  
NHWLRRVMRELLPNYDYVMDCEAGLEHISRGIIEGVDTVLTVDHSYKALRTAVRI  
SRLIDELESDVGEMWVVANRVTEGEYAVIREKGEELGLRFAGFVRPDDEVRLHLH  
GRPLTELPPDAKVRRDMRAVLTRVGVLLSDG

10 <SEQ ID No.:0722;PRT;Methanopyrus kandleri>  
MAEDKGVKNMLEHLVKNLLVEDVEEIELRNVITIELDELELDLKTVAQTL PVEIWERIL  
KPEVEEKEREVEVEPEYEPPEVEEYEGCVAEVQIGATRSDGGSRRDRVVLGGERAYF  
PFEEPRPNPPVWTFDVFDPDVGIPGPIREELGDVIEDPVDWARTVVKRYGVDIVTV  
HLVSTSPKLHDAPVEEAMETLEDILDAVKVPPIVGGSGDPEKDVVEFVKA AEVCEGE  
RVMLSSINEDMDFERVVEAAKEHGHVLT FAPVDVNL MKSLNKKVLNRGLSKEDV  
MDPTTCALGYGIEYTIDVMTRIRLAALKGDEHLQMPISSGSTNAWAAREAWMKEES  
WGPREYRGPLWEAVTATTVALCGADLLMMFHPWAVQVMEAMEYMAEGRVTGD  
15 AYVTDVIA

20 <SEQ ID No.:0723;PRT;Methanopyrus kandleri>  
VAQLSAMDVYNLLPKANCGACGCKTCMEFATKLVNREAKPEDCPKLDDDESLEKLQ  
ELLAPPVKELTIGEGDREVTG GDEV MFRHEL SFFNPPP VFVTYDDMEEDEIAGKT  
EEIQEFQVERVGEVLKLDGVAVVSRTGDPEKYARAVEIAVERSED LAVALITDPKV  
MEAGLDVFDERPLLYPATEENVEDLAKLAADGDCPLGLHARDVEDLVPLVVEAQY  
TDDLLDPGTEFGPHDVSTTDKLA EIRKAAIEEFESFGYPTLVTTFPYAFLEDDPVK  
AARRESYLASACVLRYADILIMDTVEPWALLPVL TQRQCVYTDPREPQEVEPGLYRI  
GDPDENSPVLVTTNFTLTYHCVAGDLESADIDCWLLVIDTGGLAVDVS VAGGQFTG  
25 EAVKEVIEETDIEDKVEHRVLVIPGKAAAVKGDVEDATGWDVMIGTQDSSELPEFLE  
KEGLLRIEE

30 <SEQ ID No.:0724;PRT;Methanopyrus kandleri>  
LILVTGGAGFIGSHVVEELVDRGHDVWLDNFSVGCEENLREVRDDIEIVRADVTDP  
RAVERTFREYRPEAVIHLAAQVNVRYSMESPFVDARINALGTLNLVSLAAEHDVERF  
VYASSGGAVYGEPEYLPVDEEHPTRPISNYGVSKLAGEYYVRVYAERDGF EYVILR  
YANVYGPRQDPRGEAGVPIFLLRAARGEPLTIFGDGEQTRDFVFVEDVARVTAEAV  
ERGDGVYNIGTGRET SVNDIVNAVKA VTGVDVEVVYEDPRPGEVRRIYLDPSRARE  
ELGFEPVRDLEEGIERTWEWIRRKIA

35 <SEQ ID No.:0725;PRT;Methanopyrus kandleri>  
LPDVFVLVAPDRCTDCRKCVNACERTHGHARIYKISEDAPPVTCLQCDDAPCANV  
CPVNAIVEEGDSWIVTEDCVGCGLCAVACPF GAIEMVN GRADKCTLCVDAPKKVPA  
CVEACDRGALKLVSKSQVAEEKRERFAIEMERIYRTLAKLESEEGSLRGESGSRG

40 <SEQ ID No.:0726;PRT;Methanopyrus kandleri>  
VKVGVGKGGVGKTTVAAALAKALTDVGYEVLAVDADPD PDLAYSLGLPESPTPIV  
ERRELVRERTGAEPGTTYGPVFKVNPRVSDLPDELAVRVAPGLRLLVVGSVENPGE  
GCFCPAAALARRLIRYVIADRDES VVDTDAGLEHFGRRVLESVDWVVVVCEPSVK  
45 SMKNARESVRLAREMGIERVALVKNKWREDAPEPDLDVDFELTVPYSDKLVELEME  
GRPWWEDPVVRKAGEELARRLTR

50 <SEQ ID No.:0727;PRT;Methanopyrus kandleri>  
MGGSGGEEGGRGAGKTSYEVVIREEHCKGCFLCSWVCPIDALKRSNRRNERGYLL  
PEWNGECTGCRQCELICPD LAIEVREVEGDG

<SEQ ID No.:0728;PRT;Methanopyrus kandleri>

- 5 MGKVDFLQGNEACAEGAIAAGCRFFAGYPITPSTEIAERMSARLPEVGGVYVQMED  
EIASLAAVIGASWAGVKAMTATAGPGFSLMQEHMGYAVMAETPCVIVNVQRGGPS  
TGQPTKASQSDVMQARWGSBGDYEIVALSPTVQEMYDLTIECFNWSERLRVPV  
LLTDEVVGHMRERVVLRDDVETVERELPPEGEEIEKPFPMEPDDLVPMPVFGRG  
HRVHVTGLTHDERGYPATDDPEVHRKLVMLCNKVRKRAREIHEEVGYDFEERES  
DVALVAYGGCARTVIEAAEELGVTVFRPKVVHPFDPDMIRDLLDGYEVLVEMNLG  
QYVEMVERALDRECVHLLGYPGGYPTPERVIREVKKLSG
- 10 <SEQ ID No.:0729;PRT;Methanopyrus kandleri>  
VTVVDWKELVRWDRMPHILCPGCGNGTILNALVRVLAЕКFEEGELDPDKTVLVSGI  
GCSSRLPGYVKLDSLHTTHGRPLAFATGIKLANPDLEVIVITGDGDAAGGNHIIHA  
ARRNLDVTVICANNIYGMTGGQVSPPTPRGAKSTTTPYGNPEPPFDLCELVMGAG  
APHVERWTTAHPAQLKAAIARALEREFGFSFIDVLCQCPTNYGRRNDMRDPREMVE  
WLRENTSTREEEGKIRIGILRDEEREPFHKRMIDMIEEVRTGEEGD
- 15 <SEQ ID No.:0730;PRT;Methanopyrus kandleri>  
VRKEIRISGFGGQIVLAGVVLGRAAAVYEGYNAVQTQSYGPEARGGASRSDVIVS  
DEEVMYPYVRRPDLVTMSQEAYEKYVGSVPEDGLVYDSTLVEPSREDVEHVG  
PATELAEELGLRIVANMVILGALRELTGIVSFDLSLRKAVEDSVPPGTEDVNVRAKL  
20 GAREVRE
- 25 <SEQ ID No.:0731;PRT;Methanopyrus kandleri>  
MIRLLEYQAKHLLKEAGVPIPEGDVARTSADAARIAELGGPVAVKAQVPVGARGKA  
GGILFADDPEGARKAARKLLGSRIRGETVRKVLVEEKLDIAEEWYVSITLDRAKRRP  
VLLVSREGGVDIEEVPDEKIARRYLDPIGLRPFEEAREALEAGIPKEHLRDVEEVITS  
MYEVFESYDAHLVEINPLVLTENGEVVAADAVVNLDEDAANIRHPEFAETRDFFPV  
ELDGDIGIIANGAGLTMATIDLVDLGGKPANFLDVGGGAYPTLIRRAITVAELDVKV  
ILLNIFGGITRCDEVAEGIVQALDDVDVPLVVRVLTNNEEGHRILREHGVVDVYTELK  
EAVERAVALAGA
- 30 <SEQ ID No.:0732;PRT;Methanopyrus kandleri>  
LLDSDTRVLVQGITGRHGSFHTKLMLEYGTEIVAGVTPGRGGQEVHGVVPVYDTVEE  
AVEETDAEASVIFVPAPQAPDAVMEAEAGLDPIVVITEHIPAHD TMRFVELARWEGI  
RIIGPNTPGIIVPPERVKLGIMPHQVFTGEVAVASRSGTLTYEIVQAMTEAGLGQSL  
35 CVGLGGDQIVGTTFIDFLEYVREDDRTEAVVLIGEIGGNAEELAAEYIAETDFPKPV  
AYIAGRHAPPGKRMGHAGAIERGRGTAESKIEAFRKAGVDVAEKWPVEPELLREYL
- 40 <SEQ ID No.:0733;PRT;Methanopyrus kandleri>  
LKLSVPGALTGFFHPQPGKTPKDTGSPGFGLAVDSVVIVRVRRLRAERLRVRADHPI  
DSRIARKCYEVLDPDGGLSVRYEFSVPPGCGLTSAASALGTLAGAAEIGLEVSPE  
WIARRAYEIELELGTGIGDVVTIWHGGAVLRVGPYPDEVLIHRIPVEPDLRVLIYEP  
RPIETREALDGLSGTEVALRYLKELERHPDLELALRRSLEFAERLGFSEEVKLAKELS  
HKHLGASIAMLSRTVFAVSWEQDPQADVLPVSCSSFPEIISGISEIQCERGLRDV
- 45 <SEQ ID No.:0734;PRT;Methanopyrus kandleri>  
MCEFTVKLGGEVIAEDVLYLEVTEEGVVLRDVMGEEQVIEGAQVKRIDMDEHVVEL  
ER
- 50 <SEQ ID No.:0735;PRT;Methanopyrus kandleri>  
VLEPDTRLIVALDVSPDRAVEIAETLDGYVDGFKVGYEVVLAEGAAGIERVAEVLEES  
FLLVDLKTADIPEISRSIVERVSEAGANAAIVHGFVGPDVVEECAEVLVPFVVATMSH

PGAREFYDRACRDIVKACDDIDGVVGYVAPATRPERVREVRKITDKLIASPGVGAQ  
GAAPGDAVRAGADFEIVGRAITEAHDPVEAAKDLTRAMRTSRPAER

5 <SEQ ID No.:0736;PRT;Methanopyrus kandleri>  
LGPELAAVSGFALKIADDLVDELSRPQWALPCGLVAAAAALASVATGVRPDLYLGLI  
LGNVAVAGKIDEIPHLAAAAIVALGVLTIRPEVTPLTLLVITVLATLDEIIHPVEPTGLRPV  
LKIGAVVGWAFGVLDGITALAVITFDLGYHAAELLTGAIKCSNPIRA

10 <SEQ ID No.:0737;PRT;Methanopyrus kandleri>  
VKRETFRYRGDMDLDGFLREMERVGALGAGRLGRAARILEKMWSSDDVTVLLTVA  
GPAVAGGLGELFERLIREGLVDAVITSGANVVHDALDALGGIHHVCLGERNVDGYGR  
VHDTHIPTAEFEKFEHFMREVLSDLGRVSCRELLWEMGKRLESGFLRAAADEGVP  
IYSPGILDSMVGLHVWIHSQDHDHDLVDDMHHLADLVFEAEELGAIILGGSVPKHF  
15 AMGAAMLRGGLDYAVQITMDRPETGSLSGAPLEEGKSWEKVREDAEVATIVGDYLI  
IFPLLASGVMQRLGIV

20 <SEQ ID No.:0738;PRT;Methanopyrus kandleri>  
LWESRRKSEPRFPLSFSSDDVKSPDVAVVGLPRERVLPEYPTGQAEAPNAVRSAA  
STLDFYDPEVGDPLEILTLVDEGNLRTFEPESEPEIFVVLGGDHSITPEIVQELTPRRL  
LWLDAHPDLRRSERHDGALRGCLEIVDEVFLVGVRCWSREEYDVFREHEHVSVD  
HGDITEVIDDVYVSLDLVDLPSVVPVGTTPPEPGGLPYRLCADILRWAGRKRAHLD  
VVELCPTVESHVSPVTAARLVGEYLKGVAER

25 <SEQ ID No.:0739;PRT;Methanopyrus kandleri>  
LDVAVKKVEVRQLKKGKYIMIDDEPCKIVEYTTSSPGKHGSAKARIVAVGLFDGKKR  
TLTKPVDKVDVPVIERKTAQVVSMDGDTVQLMDMETYETFEVQKPEDEELASQLE  
PGTMVEYMEAAAGKRKIVGIKEEE

30 <SEQ ID No.:0740;PRT;Methanopyrus kandleri>  
LGVPKKYALVSGTGEADTSLAAFDAALIDAGIGDCNLVELSSILPPNAEEDDLPEFPP  
GSIVPAVAKAVGRGLVSSCICVGRLESGLGIVSERAATDSVETVRRRLAKRDVEEMA  
RLRGEKLVVVRTVTASTEPEDAEEWAAVAAVVFWG

35 <SEQ ID No.:0741;PRT;Methanopyrus kandleri>  
VRETVEKIVKERVLPVSKVRRGWVEVGRGADGTPTMRVDEVAEREFLRGLEEEG  
VDARVISEESGEMRVGEAPEVTLVLDPLDGSHNASRGLPFYCVSVGIADPEAETLD  
DVEEGLVSELLTFGPGDVEEKPVVERPLVSAYYYGSDRMPVEFSRGRFKLRCLG  
SVALELALVGKGALDGFVDVRGSLRPTDVAGAFGAARGELAFIFARNGRELDPSEIP  
LRPDFRFELATARSEDEARELFEALKEDVGIRVAQRLFGKHPEGLSEHALCGKLGE  
40 ECCELAHAVGKEEGYGEELADV FALVMNLANELDVDVLTERRKFRRVFGCSDRR  
SSV

45 <SEQ ID No.:0742;PRT;Methanopyrus kandleri>  
MFRPQVVGVTGRTDLGRAVRVAERVCRLCDREGFEVLVDDSLGIGEYPRVNLKDM  
GKEVDMIIITIGGDGTILRVSRITSEYEVPI LGVNLGKFGFLTEVSESGLKEAVSRLARG  
DFNLEEHRKLRIKIGGSDEGDALNEVTVITSRPAKMIRYRLSIDGFELETTWADGVLV  
ATPTGSTAYSLSAGGPIVEPQVECSIITPLNPFKLEARPMVVSMDRRVEIDVDDPER  
AEVVVDGQEYMNLDGTVSVTRSPNVARFIRFGSTYFERLKEKFLRWD

50 <SEQ ID No.:0743;PRT;Methanopyrus kandleri>  
LDPDLPTNVLEEILKKSARSADGVLGVRMSAKKEYYRVIESLSLALAELSVLAARHAG  
RKTVKAEDVELAAATLDVISSIRDPRGRGGSRG

- 5 <SEQ ID No.:0744;PRT;Methanopyrus kandleri>  
VLGGTQLTTYVLDTSALIKGVPELLDGPAYTVPEVIEELKDDLSRVRYEVASVRVKE  
PEDWAVRRARRRAKVTGDLPRLSKTDLKVLAALIELMEEQDVVLVSSDYSVQNVAL  
TLGIRVYGPVHGDEVIGPGGRRWRPSV
- 10 <SEQ ID No.:0745;PRT;Methanopyrus kandleri>  
LETVGVTTVTVSGLTGSKRVAARVDTGAENDSIDKLASEIGAGPVIGVKKVRASAS  
ASRLRSERRPVVHTLELAGRCLPSEATLADRRDMRYPMIVGRKTLRRAGVTVDP  
REEEPGDEVDPRRVGTLKLHKRLLRTVGEKRAVTPAVLALQHGGAWSYRDGDV  
SSVAVPIRKLSNGVREDLYLLLNPEIERAEGTLTRLEKCGRERVRRVAKRPRRLEV  
RHDGGAIIRVDPGRRRIRVRELDPGTLRLEGIPAANLHHELHSHLMGDDLGPSVLEFE  
VE
- 15 <SEQ ID No.:0746;PRT;Methanopyrus kandleri>  
VKGDTITVSETIRVATRSSLAIQTREVIELLERESPRDVEVEIVKTKSRGDVVRDRP  
LHKLGEKGVFVKEVDRLVLEGKADIAVHSAKDVPVVDYPVDVAAPPRRDPRECL  
VSRHGGLKELPRGATVGTSSPRRRAQILLERPDVKVEPMRGNVDTRVSKVRRREY  
DAAVLAKVGLDRLGMTSEVSEVYDPEEFVPPAGQGALMITCRKDDDRVKRLLEV  
20 DEKSRVEVETEKAVVRELGVGCSEPVGVHVRARDGDHVRVLVGLFEEDGSCGHVL  
KMRGSPEDVVREAVSQAREVLSDG
- 25 <SEQ ID No.:0747;PRT;Methanopyrus kandleri>  
MGELYLVGGGLSDVRDLTLRALEVLA SVELVLDVTYTSVYDVSEGDLKRLNNGFGG  
DPEVRMCSRDLERFFDLCEGYDRVALLSPGDPMAATTHVALVVEAADRGWDVE  
IINGVSVFTAAPSKSGLEMYRFGRTATIPLNVRVSVYPYDVLESNRQAGLHTLFLLEVA  
EDGEFVSVADAARYLLEIEREEGRGVLDPSDLAIAVVRLGFEDLVAWGTLEELSD  
WEPGEPPQALILPASRLREAEREYIRRVLPHIRDVRGV
- 30 <SEQ ID No.:0748;PRT;Methanopyrus kandleri>  
LGEETGGDYHVLEAAWIVYNVDDDDAINIAIAEAGKRLNRHGLDYVDIDVGFYEC  
PECGNEIEGVWIVAGTALVRLILSMRVFNAESEEHAIRIAKYEIGQALEDVPLGVVEV  
TPL
- 35 <SEQ ID No.:0749;PRT;Methanopyrus kandleri>  
LYVVPYNTGEALLDFFVITHLTIPFALSYSSVTQVRVLSLSLFTLGV LALLFTVDAFSLF  
LPVSRHEFTHPFGPLAALAAWATSRYLQLLETRGITAARRTRPYFNLLWVYVGMVG  
GIMHRDFLLSWFLCWALTEHFIKYLKVESRFRAFAAARAAMSKRSIVMATLMAIGF  
LGLLELLAYVLNKPVSPTLRIKRFAEYTVPGLEFVAKNTHIGHSTKALPAGYEWRG  
40 FGDGFVTLVPGYLMMFRLDVPTLHGALVKKDLDYMLPGLFTWAFDFGYIGAVLL  
SIWVAATLYVGSRCLESEYIKLRRRRMTARFLAREAMLFGLIAFSVQSLIGVFLFSRA  
MNSFALATFTLLSALIWAHLVRGK
- 45 <SEQ ID No.:0750;PRT;Methanopyrus kandleri>  
LIPLIALLALVSGASATFNMIVITDPSGKDPNGAAAASMSFAPNMFQSTFLVSKKLHV  
AVLAGGLSKGTARLEAILACIRALELGEDIESAVRAGISRSPTDRLLVGGPGKGVAVG  
GSYDIAVVIVKGNKIIKQYHSSGGPNIVRIKPNVKCAVIHLRNTPGNPMYGTATKVRI  
EAAIMAGRMIRDGLPATEIVTRIMGYVAKKSGEKYGGGVVNITAGLSTGDTFVPPKL  
NARGIPMDTAYRKVCPKCGWSVAYPAASKYSRCPVCGSSLRTEYAWQVARDMITV  
50 RKDQPIVRVYGIKSVYDKVSIVETVQTLVQAGKKQPEDIAAIDSDIDNNTLLGYDYIL  
PGDVKVEPEANLITIYMRPLPEGYKKPPLKTPISPETLHSLGLISSAVGVALIVLGGIRE  
LVNRRRLRAW

<SEQ ID No.:0751;PRT;Methanopyrus kandleri>  
VEEERKRKWIKPWPVSRRLAIMLMGALLSIGRIA EYTAWAARPVPKQEGRLRIIGID  
VVGCDLPEEVIRSNVMASGLRPGSVIKGGTLITPEGKKIPLHEAIRRARIYAMRSVIP  
5 GTKIKPIRSVQITIKRSGVVVVRVIEDYGLPR

<SEQ ID No.:0752;PRT;Methanopyrus kandleri>  
LKLTVRELAENVEGEIRSGDPDSMIAGWFSTLGRAKEGDVVIRWWLDDKGAEIASE  
RGVACLVT EHPRGKLIERCDELGIPLILTEVDRANEYALRVAREKCAPDATAICVTGT  
10 NGKSTTNHLLHHILDTAGFDAYCNTDFRSEKNTLIDPVVAMELREERPEDYLCVEVS  
EVQGLPTGRIMEDHAYRMAKALKCELAVVTNVGVDHTNLVSSLEEMVDAVYGVVR  
ALRKGGIAVLNRDDRYVRMTREGVETVWYGWDEGYSHIEERDGEWIVLDEEPLI  
PVREFPLPVDHFLYNALA AAVAAGALGIDREDIAEGLRTYQPLKRRFERLCDDPLIYD  
DFCHNPDGVLATVRALRRLGRSKVIVVFAIRGSRGVDINRQIARALAEAGKDLQDEG  
15 IHVHVIATSSEGLVDDANVVRPEERRAFLEELERSGIDYEHYDRLEDALERALDLAD  
DDTVILLGGAQGM EPAREVLRDMGAI

<SEQ ID No.:0753;PRT;Methanopyrus kandleri>  
MIIETFTLSTVTSAVTVGLLRKYMREANVDRPIVTEHAHKSGMPIMGGLGILLGTAS  
20 GPLLASIQALPPIASALPMMVLGIVDDLLGLQVEEFQKVVRNVSNRPIELGRLILQPG  
EEARVATEKAKRDLKRILEEDPDAIEIVGEVPIKKELSEREKLALQTGAALFVLPVIPA  
TWLWIPKVG VWNLSYLFYPVAVFGIVGATNAVN LIDGMDGLAAGLLFLASLACSGVC  
LGQGQLPGA AFFASLAGASLGFLFHNRYPAKIFMGDTGSCFLGAAYAAGALYYKIEI  
PAMIALGVPVLSTLISLLHRAGVIRLAVEPLHHHIQYKYDLPEPVVALHWTAGAVFA  
25 AVALWISVG

<SEQ ID No.:0754;PRT;Methanopyrus kandleri>  
VKVLFVGARLLRDVAEYAGSTGVYRILTESNPRSRDWELADEVHFVPRGMEHPTRI  
ARERHVDGVVPLIGVDDPLPAVGEMKEELEAE GIRVVASDRESVEIGDKVRTKRAF  
30 EELNVPTPEWEVVENERPSISPPVVVKDPRSQAGLGVT VHETHKPRVSGRKLVEEF  
IEGAEVSIEVLSWDGEV VPLVPVFKGSTADRRHPIDRMSPAPIDPSVERKIRCA  
VRVVEHLGLEGNVDFDVVRENEFWFLEFNPRPSGTRYMTSGCTGIWPLRELVD M  
AADRW RPPKIRKLWCAIECPVWRPTDKDPLREMF DGGVYHV FYEYYGRFDV GGR  
VTVRGDSFKEALTRLRSALKAAGADV KRAEREYRRRLREIEEYL

<SEQ ID No.:0755;PRT;Methanopyrus kandleri>  
LAELPWSTVLVIGVCGPVCNLAARVLAERGYDV IASDLRDECEFAETLLEYSNVELV  
LGGHPPEIFERA EVVPPPSLSRDAKPYRLAEDHGCEIVEVKELL DMLPPTRPVIGV  
GGTNGKTTT VAMIRHVCEQLGLEAPHHGLPGMQGNVGLLPPLQARLP GDVSVLEIA  
40 TFGKRGEILEAAELSQVECVCVTNITPDHLNEAGDFTYARCEAELLEPDTIELAVLN  
AQDPLVVGAP EVVDFNGDIVYGLDVEPFDTSEKECWCGGHVEVHEILPWVGPFK  
CRECGLRSPEPDY LATDVL SGFRLICPDGEYEVRLPVMGLHNAYNALAAI AVCSEF  
LGLDVEDVVEALQS FEGVEGRLEV LWDDGERV VILDYGHNPAGVDATLRCVKEAY  
RERRVCAVIAVASELGPEGDEEILRRAADLADLVV VASYAAYEVM DRVDADNVIAAE  
45 SATKPF EKKGTLGASREQVLDGLKEALRSDCEVVVLFGEAPLKYREEISEEVERVLG  
DER

<SEQ ID No.:0756;PRT;Methanopyrus kandleri>  
MTSPSSIALSGKDSVATLIDAADRWNVKVAVTVVHEFTDKTCLENARKAAEHVG  
50 VDHEVVKLRLREW FARALKEGRPICTKCGRSVLTAA CLRARELG CATVLTGHEL RG  
KFGRRTHPYPPGVT VRYPALRRWTWEDIRDIVSSLGWFNPEYTCPIRPYGVHRF  
IEEVGYNPLTGR ACTIMLEGVATPQEALAYLRETETPEEDPERVLDILGLEEKAAFPN



GIPDGPRDEDEIIRDLTyrLLMYARQALRSLVRGTLNRRVERRERFTQLYFVMSEYGK  
IDDRVEHLDieAFVRLATGDREEAERLLRDVKKLMRSILAEYGRTIPGARP

5 <SEQ ID No.:0757;PRT;Methanopyrus kandleri>  
VEEKELRDLVRRYALENAARYGGRANPNVMMKKIMKEHEELRPRAKEVLKTVREV  
REVNKMSGEEIRRELEELGGPREDVARDKEGLKPLPGAEPGNVRLRFAPNPSGPL  
HIGHARAAVLNDEYARRYDGTLLVRIEDTDPRRVDPEAYDMIEEDLEWLGVNIDERY  
VQSNRIELYYMVCEELLEREGAYVCTCDPDEFRRRLRDVGRACPCRSRDKEENLEL  
10 WEEMLDGTFSEGEAVVRVKTEVDHPDPAVREWIAFRIVEEEHPMTGSRYLWVPTM  
NFAVAVDDHLMNITHVLRGKDHESENTRRQKYVFEHLGWDTPYVHYGILKVEGAVL  
STSEIRRGIDSGEYTGWDDVRVATLRALRRRGIKPEAIRETILEIGLTDVATFSWEH  
LYARNRK MIDPESHRYFFVRDPVELRIEGMKESVLARLPLHPDRDEGERVLILHPEN  
GVARALLDGEDAEDLWEGDVVRLMNAVNVIEEVDGWLRGRYHSDDYRIAKEEG  
15 AQIVHWVPPDQAVRCEVVRPDGVSVEGYAEINVEREQAGSTVQFERLYFVRLEEV  
SSGGVRAVYAHD

20 <SEQ ID No.:0758;PRT;Methanopyrus kandleri>  
LAEETTPRDPFSVTIRTIRTSIRDAISSVYEVDELIEVPIDENPPVEGADLATPVALSLA  
KELDENPRELAETIVEESDLDDVVFVEKAWVEGPGFINLKLDRSQYAALTRSIFYYG  
EEYGSLDLGMGRP VILEHTSANPNGPLHIGHGRNAVIGDILARCMVFTNYGVEVQY  
YVNDMGKQIAMLAWKYIKEGRPEVPEGEKPDFFGKLYTEAAREIEEDPELEEVE  
RFLRSYERYLVEEESRAERIADAFQTVVEECLRGHIQTLERLRVAHDFVYSEFAR  
DALEIVEKLLDMGVAEEREDGAVVDLEDYGIDKELVLRSDGTTLYTRDIAYHLW  
KLGRATFVVDVLGADHKLAVEQLRAVLDMLEENPDRIIDVVFYEFIHLPESMSTRKG  
25 RYVTLDEFLEEAKKRALEKMKAAAGVAEELSDEEREKIAEEIAIGAVRFARVSPNKPI  
EFDWDEALDFRRGGPFIQYAYARAKSILRKADEEVNRFDAAYLNDDHSFELILKMSK  
FPRHVAQCVRKRPRDILA EYAYDLAKTFHTFYEEVPLHVEDDEVREARLKLVEAFT  
IVAENLMNLLGIPTLERM

30 <SEQ ID No.:0759;PRT;Methanopyrus kandleri>  
MAESSTVERYRFRKMIERLENLRGQGTELITIYIPPENRLSDVIAQMREEYSQASNIK  
SKRTRKNVQSAIEVVMQRLKMOVGETPENGLVVLVGTVDGTKEKMVAELIEPPEPV  
DRFIYRCD SKFYLEPLKEYLEEKDVYGILVMDRREATIGLVKGKRIEVPKRLTSDVPG  
KHKAGGQSQRFRDLIEHAAHEFYQKVGEAAREAFEDVKDLKGIIVGGPGPTKEEF  
35 LDGDYLPKDLKEKVLTVVDVGNTDESGLREALNKAEEALKEAELVREKRLVRKFME  
EAVNGELAAYGEEVDELLKMGAVEVLLVSEDLEGYKVILRCPECGYENIVTVKEKDE  
AKKYVEECPECGEAELNV EEEKDIVDYVELAEQMGSNVEIISTETEEGAQFYNAFR  
GLGALLRFRPK

40 <SEQ ID No.:0760;PRT;Methanopyrus kandleri>  
MYSVALGGSVVNVDPKPERIKETAEILRNLDSGLKICVVVGGGPTARRYINVARNL  
GTPETLLDEMGI AVTRLNAMLLGAALGLHDLHPETPVEAARIVRRNGVAVCGGTH  
PGHTTDAVAAMIAELLEGLVIVTNVDGVYDKDPSEPGARKLREL RPEELEELAVRA  
45 ELKAGGSFVVDPLAAKMISRGQIVTHVVSWE DFRSRGLENVVRGRHNGTII EG

45 <SEQ ID No.:0761;PRT;Methanopyrus kandleri>  
LTERVPPHSHCIVCGAAIPEG ERF CSEKCRM EYERRR KKAATLQWMLAGALIALGV  
VLM LRGV

50 <SEQ ID No.:0762;PRT;Methanopyrus kandleri>  
MIKTIRTPVGEFKLLVDSYQLDLLRDVRRVVFVFTSMVAEVAEDTFADLGAGTGPLSV  
VAAHAGAERVI AVEKNPKRARLLEKNLRKHVPHDVEWEVVG DARDVDVNADVVA

CEMIDTLLLEEKFPVINAVLERYEPTIVPQEVRIKANPIRRPPRTPRYRPGLPEDIEP  
LEVIRTDKPIPKKFYEYETPEPGYAFFTWVEYEGTIAGGSDVFCPVLELPTPGDVLIGV  
RGAGLPSLRSYTPEHQDHT

5 <SEQ ID No.:0763;PRT;Methanopyrus kandleri>  
LLDTVKDYMMSGVIKRAKRGNDIAMLIDGPNMLRKEFDVSLKEVRELVEELGNIRV  
GLAFLNQYASDKLIEAVANQGFVPRVIPGDVDVYLAVEAMELIYSDNVDAIALMTRDT  
DFLPIIAKAKEQGKVTIVIGADPGFSTALQNAADYVIKLPKRESESEGKEEKPEEAK  
DVVSDE

10 <SEQ ID No.:0764;PRT;Methanopyrus kandleri>  
MKRRWKLYSRVRELIAEGKNDRVAAALALEGYRRPPGGDRVHDDIVTLIKTERGL  
EGASLHPEKCLRLREILGLKLKEVWRRFQEPQARSAALDAVASAENVEPEEEISLPR  
DYGRAVTLRAKIVADTAEKLGDEVILVGSAHIARELDRGILLQIVDEDPRLRVERNI  
15 KFGESVLLSTGMVLSNGSVRRFLASHKGPVVLVSQSCPHLTAVLTRQGVVDAAVVE  
EFPYHFSPGGECKLRVYEPERPAR

<SEQ ID No.:0765;PRT;Methanopyrus kandleri>  
LSELMVDVHLLSHKVPERRLEKEVSEALRRAGFDVLSVRATRGSDIVGAFAVEY  
20 VILVDVRGEGDPEGPVKRALRDYGRVEVQVGSRSRSGSGECDEEALFEGSKGAD  
SGG

<SEQ ID No.:0766;PRT;Methanopyrus kandleri>  
MKELMGVEPQTEGQERLVEALLNEENEIVAVFGPTGTGKTLFCAAYGVQAVMEGE  
25 YDRFIVTRPLVDVATKQEMSSADLPEKFEEMVVTVMVDVLSRFTGRDELQQLVDEG  
KIMIVDTHFVRGRTFDDAVILLDEVQNMLPENAGEVLARMGHNSRLITGDPVLQKD  
VDIDRCGATVMREVLAEPEKAEEVDLGTDRDIVRPGAERGVLHLQLEIRVRNREMNDV  
EREIMDVVQVEAPDADVLTVLYVEPIAEDLEIKTENVPQAVIVTKEGHVGRVVGTTGG  
ERIERIEAETNMRIVVTHLTLDVDFDIADHPVPWIGERIVDVIAGPNLKVWIDQKDF  
30 GPFGMGQRGRYARYVEEVLQELLGMGLEVEQA

<SEQ ID No.:0767;PRT;Methanopyrus kandleri>  
LKRVTVGNSRRVLRQAVRVSLKPVYKMYERILEEKVKEGRVPEHVGIIMDGNRRFA  
RELGLEPWEGHRYGADKLEDVLEWCLDLGVKAVTVYALSTENLNRPKELKRLFDL  
35 MEERFKALAESERIHRRKVAVRAVGRHLHLLPTRVRRRAIKKAERATKEYKDRFLNAV  
AYGGRQEIIDAVREIAHDVKVGRDPDEIDEGTFRKYVYVGDLPDELIIRTSGEERL  
SNFLLWYSAYSSELYFVDVYWPEFRKIDLLRAIREFQKRERRFR

<SEQ ID No.:0768;PRT;Methanopyrus kandleri>  
40 MMIGILSDTHDNLKAIERLASSELNEADVVLHAGDYVAPFTLPVLAKVECDEFIGVF  
GNNDGERDYLREKAEVGFELVGEIFTGEVLGLRVAMIHGTEEA VVEALARCGEYD  
LVVYGHTHEPEERVVGD TLVNPGEVCGYVTGRRTAALLDPDEKKVEFVEF

<SEQ ID No.:0769;PRT;Methanopyrus kandleri>  
45 LAALRTPVRRYTLRVNTLKADLEDVVECLASDFPDREVRESPYSEYAVEIEVKGPYP  
VEGNHHVVVADKFAAESVYVGADLYAPGVVQADPDIRRGDRVTVVSERGHPVASG  
EAALQGREMEKDRGTAVRVD RPTFSAPKVRETEAYRRGWVYSQGLPSILAVEAL  
SPEPGETVVDLCAAPGGKCSHVAQITGPESKIVADR SAPRLERMEARLRLRGIDWV  
ETVHGDARKVVRRLRG TADVVLVDPPCTALGVRPKLWVEATYEEALGLPSYQYSL  
50 RAGYEV LKEGGRLYSTCTLTPTENELVVERAIRELNLEPETPVL RPARRSGPGVVF  
LPHRADVP GFFYAVLVKEG

- <SEQ ID No.:0770;PRT;Methanopyrus kandleri>  
VKRRAIPAMAAGVAVVLIMIWSFDPRKVLTVIARTEPRLFALAVCIQLVDLLLWALRW  
HLVLRGGVKAPFRLVFAVNNVSMMLVNNITPSARSGGEPLRVYLLARMTRYRARDI  
ASSVVIDRVLDFPLTLLLLSAFLIAGSGGRGGILVILLGGVSFLTAAILSLWFLASE  
5 RYVHRVARGVLRLLSRVSRVRARRLWEELDEWVERFVKQLRELLQDRLTLIQGTL  
LSAAVWGCEILRTYVFLSLGREVPLPVIVVSFTVSMFAGVPLLPGGGLGLVEISTAS  
VYRLWGIDPGTSAVALLDRLISYWMVNAIGVISLLRISRER
- <SEQ ID No.:0771;PRT;Methanopyrus kandleri>  
10 LIFKKRKGGKRERPEIDLKLPPEEGEGAPKLKLPKPEGRPGESKGAEAVPKLKLKP  
PKPSEKPPSGEEEEKKKEERPPAEIKPPKPPEERTAPSNLEAELERLKAENKKLREE  
LDEWRNKAksamGERDRLRSEIKRLKEELEKQEKELDKYIKISKQLKEKLEKAKRES  
EELKEKAEERYERYEKIAGKYNELKSKLEDLSDQNRRLAENLKKLKEYNEIKEERD  
RLKEETKEVGKLDQLAKLQSKLKEVKSERDDLANEVEALRNENEKLRKKIDKLKSE  
15 LSNLQKKLKDREKKLEKARQHIGKLREEIKRRDEEIRKLKAQSKLKDEIKRYEEGKR  
LLVPPETEMAIKVKGSIVIGKNSMVKALQEDEPIVVKEEINVKDNSRIYGTIVAKNISI  
GSNVKIYGNVICENKLEIGEGSTVKGHVISINSLKTSADVIEGSMVSGDDISLANNVE  
VKEVLITPGSVKASQGLSVAAVLCNDFESAGSIEADYILADERVKLGDDSFVKTIVIR  
EGPVEQGVNSCVYYGSLSIKGRNPPLYINTEPFDDPVANRVFRKTISNVERLGPFHL  
20 AKSEKDAKFVLNRVTKMDIAEIVKELRESLKV
- <SEQ ID No.:0772;PRT;Methanopyrus kandleri>  
VGIEVKEIRPGRGRPELVYARAELVVHKESSLKATLIGREGSTIREIGKRARELLEERV  
GKPFYDLTVVDPKRSPTNRWFKVRDSSEAWLCPAFKHPHLVSVRESRIRGNAR  
25 VAAFVELEHVTVHGGAMISNFSSIRRSVLHKRVSVSSHCEIERSELGPVTFVGDGAE  
IHGCKIEERCfVGMNARLSRCEIGRWSVVGAGAHISDSRVPERSLVGNSIVDRLDV  
YTLVVGKRLKLELNGGEIWSGQGEKYVVCYLPEDNRITVRPEPTERVLCVVRKAND  
KWEVRGEGFVRTVRGSSSLHWYVGHERRLLG
- <SEQ ID No.:0773;PRT;Methanopyrus kandleri>  
30 LALPRIYVETDEVPESGKILLTDPEFEVIVRSRELAEKIAEELDEPIFYEQVVEEARS  
VFDVPEAKVTRHVIEPVDRLSLVFLKPGDRVYQIPVEGYVVTPIADVGDRLRKGD  
LAAVTTRSGNVRYVEAPQDCLVVYVCEQPAIRTQRRPNYEYYIAPTE
- <SEQ ID No.:0774;PRT;Methanopyrus kandleri>  
35 MRSEILKELNRARELVDAKIEEVLPRGGPEDLYDACWHLIEAGGKRIRPLLAIKSCLM  
LGGSEEDVLPEAVAVELIHTFTLIHDDIMDEDDERRGVPAVHVKGWGPVAILAGDTL  
FSKAFEVAAEGGDVEAVKELARACTEICEGQAMDIGFENRTEVTEDEFLEMIRKKTA  
ALIRTSCVVGGLKAGANREQLEALREYGENLGIAFQIQDDVLDLVGDESELGKPVGS  
40 DIVEGKKTIVIKGLELADEEQRRERILSVLGNEDASREDVREVIQILEDLGADYAKKR  
AREYADRAKAALRELPENEHREFLEKLADFVVEREF
- <SEQ ID No.:0775;PRT;Methanopyrus kandleri>  
45 VEPLTVEVFAVGGYGEAGGRNMTAVRVDEEIVIFDCGMSLDKSLVFÉKDFQKASAR  
ELRRVKAIPNDPILRPHRSKTVAAVLSHAHLDHIGAVPKLLFKYKCPVFGTEFTIELVK  
ADLRNEIRYADEAEDIMINLYTVEPGDEVQISSKRLLEFIPISHSIPCCVLPVLHTPYGA  
IVYACDFKFDDNQIIGYKPDYKRLKQLGKEGVLLLITESLRVAEEIKTPSESVAREMV  
NDVLRFADEESEGIIITTFSSHIERIQAIADTADRLGRKVILAGRSMGKYGRIAEELGL  
LNLPAAGRIYDRPETIRRGLEKEDYLLIVTGHQGEPAVLPRIVDGELPYRLT  
50 EEDSVVFSSTIPSPINRANRYVLDTKLRLKGVMFKDVHVS GHAGREDHRLMLRM  
LQPEFIVPAHGDPDMLAAYAELATQEGYEVNRDVFIMFDGTKLSLPL

<SEQ ID No.:0776;PRT;Methanopyrus kandleri>

LVRGSRAEGMRERKWEHVLACIWEDVESEESPLFDCVKIVHRALPELDFDDVDMEI  
ELFGKRLSFPLIAGMTGGHPKTGEINRKLARVARELEIGIGVGSQRAGVKDPEVRW  
TFEVVREEYPDGLVLANIGLPQLRENGPDALAEVDMVDADALAVHVNVLQEAQVL  
5 EGEADAAGFVDVLAEVCETVDVPVVLKETGAGVSAEDAKLVRDIVDGDVGGAGGT  
NWAVVEAVRSKAHGEIPLGYAFSDWGVPTAASILEVRSVVGNDLAIIGTGGVVRTGM  
DVAKVLALGADCAGMALPVLRLKVLAEVVRGCVRLKSIAREVKIAMLMAGCSSVEE  
MSSVPIVYVKLREWLECRGVPLDLVCTGDRRTGWNR

<SEQ ID No.:0777;PRT;Methanopyrus kandleri>

VFTVLKLGGSVITDKSKPKTAREDRIIRLMKVISDWRGDLVLIHGGGSFGHYAASRV  
SDLQKGVSEVRRAMHELLSIVEKVAVDSGVRVYPVTPATVLYSLNVLDLLERGCV  
PLLYGDVVPDHDGDGFRIMSGDEIAERVS WLGPDRVGFMSVDGVYPRTPPEEGEP  
15 LRELSPDEARDLARQLEGSAGVDVTGGIAEKLRRARIAERGAEVYMFDPARDPENV  
DRFLRGEHVGRITR

<SEQ ID No.:0778;PRT;Methanopyrus kandleri>

MKPVTLIRPSGEVTAKSAPVRKTLGELARRLERLGEVVRVRGPRLIVPGHHPNAA  
SEFGVEGALPGYKVRPKPATILKATRRALRECPEEIRVDVRSHHDGVS GHALFESV  
20 REIVESTGRKTSKRGSRLLVEVYPDVA YVCGPEKAGPGGLPVGTQGRALCLLSGGF  
DSPVATWMVMRRGLECKGLHFLVTESELEAARENERVLRRWCPDFDLLVDESHRE  
FLETAERLTGRLKRYLCVVCKMRMLERASQWADRLGCD CIVTGDSLQGVASQTV  
WNLKLEESQVNGIVLRPLVGLNKPEIVRYGRRIGVPERDPGRCPFVPERLIVKPRKR  
EALRAYREVIKG

<SEQ ID No.:0779;PRT;Methanopyrus kandleri>

LREEVASSPQGLGLEILAKHKVSDFVRHGAIAVKPDEPLWNALKAMVTHGIHGAAV  
MEDSKI VGA FEEDDLLRALLEEDALAAEVKRFMKPAVVVKSSDTFQNAMVEMLK  
GNTTRAFVRSSGLLRSGVYGVISASDIVRVLTGDYRGFRAPGNTDRPVSPPKVGDIF  
30 WPGSVAIKQVIRNSPLTLDASSSVADVARCISEKGRHYAVLLEGESPIGRAGDKDVM  
GAALDAILNRRDLHDLTARNYLQEMVVVPETPLHEALWEVIDKMSDRIYVMDGRK  
LTGVVPLIDAVYTLAKVASD

<SEQ ID No.:0780;PRT;Methanopyrus kandleri>

LVDLDCCVVC GDSPE SIVDEVERLGDRADFGIVFFHDIDPEDVVS ELSYGVVERFVG  
CVAGEGHYPG SVKG HKISLLALKTEWMAKFGTGGSARQDPGEASRGAL EEA FEDL  
DFDPYDVSY SALNLKDPKRIVMYRPVIGITFIEGATFHN LGGTGLEVL SGFRFGSGPA  
AESIRTFGALSSDPELESAPVVC DKGVFESGAVYATISTFLKVSWSFASSLKPVTKL  
GTVTKSRENVIVEIDGRP AGEVYIEKLEEVTDYVKACPNEYVYKELPPLGVVRV FPS  
40 VGHRIIPRTPLEVTDYI RTAGYVVEGEQLLL LGFDDRP NAPVRAYQGSLS SGEEPL  
ASILVTFAGRKPLKEEIPDKHCVGMYSFG EII PITGYNEFH NHVSACLTIFREP VFD

<SEQ ID No.:0781;PRT;Methanopyrus kandleri>

LRDVIRGRAWVFGDDIDTDQIIPGRYLTTQDPEELAKHVMEGADPEFPEKVREGDVI  
45 VAGKNFGCGSSREHAPIALKAAGIACVTRSFARIFYRNAINLGLPLVVC PGVDDAF  
EDGQGIEVNLREGYVRNLDTGEELEAKPLPDFMMRILEAGGLVELIKREGPRAFEG

<SEQ ID No.:0782;PRT;Methanopyrus kandleri>

VAYKIAVIPGDGIGPEVIEAALHVIEPLIDAEFVEGEAGDECAEKHGDPLPEDTLELCH  
50 EADAILFGAAGETAADVIVRLRQELDYANIRPVRGFPGLRELTGEPYVRDDVDFVIV  
RENTEGLYSIEGRFRDTAYTLRIITEEGTRRIA EVACDLAEERGSNTVTCVHKANV  
MRETCGLFREVCKEVVESRGLEFE EYV DAAAMFMITEPERFDVVVTPNMFGDILS

DEAAALVGGGLGLAPSGNVGDRHGLFEPVHGSAPDIAGKGIANPFATILSAVMMLEW  
LGEDEAAEAVREAVGEAIREGVVTPDLGGDKKTMEVAEFVREAALNRVQ

<SEQ ID No.:0783;PRT;Methanopyrus kandleri>

5 MMSIKMTIGATGAAEAASHGDVIVVVDVNTSSAAEVALREGAVAVVGAAPDSAYR  
VLSGEHAAKYPFAETPEGVDPVERGREAGKIAVEEGCDVVLVVDGGEDNASLARK  
GVEDVGAEIREVVPNAGPRIKDVDPAGKVFLFATATGGTLYDVAKTHGAPAVTFG  
TVVRRSFTRACVERALRLAGRYGAGVTIVVSSIFAPEDLDAGARIFEEACKVITESVC  
EERFEDVVSRL

10 <SEQ ID No.:0784;PRT;Methanopyrus kandleri>

VDRYPDENG YFGEYGGRFVPETLMPALEELED A FKEAREDPEFWEELEELWRKYA  
GRPTPLY YARNLSRKLGKVYLKREDLVHGGAHKL NNTLGQALLADRMGKDRIIAE  
TGAGQHGLATAMAGAALGKKVEIYMG AIDVERQKHNVFRMELMGAKVHPVKAGTQ  
15 TLKDAINEALRDWITNLETTHYLLGSVVGPHYPWIVREFQRVIGRETKEQITELEGG  
LPDAIVACTGGGSNSIGIFYDFLDDEEVALYAVEAGGKGLDTDEHSASLCAGEVGV  
HGCRTKVLQDEHGQIRPTHSIAPGLDYPGVGP ELAFLVDEGRVTADAVTDEEALRG  
FVMLNETEGILPALESAHAVYYVKKLVERGELDRGDVVVNLSGRGDKDVRIAAEEL  
GVEI

20 <SEQ ID No.:0785;PRT;Methanopyrus kandleri>

LDELIKDLEEGAGEK GELLAEIVYERADSLEEMLELLED M GMEGIKVD FVGDKEDPE  
EIVITVETT VTFEYEE NPEVKEEMGFTEPACELEQALFRKLAELKYDKSMEIETKC  
QLAGDDICKFRIVPKE

25 <SEQ ID No.:0786;PRT;Methanopyrus kandleri>

LKYFKRLSDRERAI FEAGITLGA IYHQFCGTPVSPGTAE EVAKCIERAALLQPCVIDA  
RVEVDVSS EDDNYGGYTEVSGRNLRVTIVTRCGEWEAVGKLEFIEELNYPLMWVE  
EIRRVEQ

30 <SEQ ID No.:0787;PRT;Methanopyrus kandleri>

VTVIGIAADFDPPH RGHAYLLDRARDLGDEVVFLNADYTAHHTPPLL PYRLRREIVL  
ELGADEVIPVRGYHQRFPLAYTVPVRVRLMAEEGV D VILDAGPSRNLDR LREHVER  
VLEVSDLFSIPP NVPARNVWRWLA AVEYVNRELGT DVELLIP ELEGYSGRKIRAALR  
35 RSGYSPDSL RKVRRHLPRET FKKLERYLKARTPPIARRKELLDV LNRASSYELCSIA  
HLNTIAVREILRGRPF RSRQVWGALRRADYGSVLTRLALANTECRVTSDEIARIALS  
WCVERLVPENQSPDSMYRRDWFVAALSSHGVKARDADR LYKRADSYEEARRLAR  
RRYGVDPGVPRFETLIGEARVSDGEYRPAISANGRLGVVEDG FQELRATAFGATLL  
RYVLDDPFVD A VIRVEDEEARLIVFP GDSP

40 <SEQ ID No.:0788;PRT;Methanopyrus kandleri>

VRRIW FHLDSKNRYSLAHVLGAVEARAPELIPYIEVSRNP DPEPGDIVVFSFNTFMA  
PEVFEVVERLHDDVVKLAGGPHPSARPDQCLEHGFDIVLIGEGEEV VPEVLRELIRG  
KEPEERPGVYL GEGNPQAPRVEDLDRFP PYSEGFRIFCSVEITRGCPWGC AFCQ  
45 VTRLFGPKLRHRSVEDVVRWVRRGVERYGHTFARFVAPDALAYGSPDGIRLKPDR  
VKRLLRSLRSIEGLEKVFFGSFPAELRPDSIAKGD AIELIAHYADNERV NIGAQS GSE  
RVLKRIERGHTVEDVEVAVEKALEVGLKPVVDFIFGLPGETEEDQLASVELARWIIKR  
GGEVRLHYFMPLPGTPLENEEPAPLSSKIR RILGRWTQEGKAEGAWGHQMRLSKT  
AMKVLSG

50 <SEQ ID No.:0789;PRT;Methanopyrus kandleri>

5 VGTPDEALQDRDESPERVMELEVLVLSAALYRRTVKALRDLTGFAREVVGLEEF  
VGIVENPREYVRWLAKRVDEGTAEDALLTLVGGSGALVVRVGGDTYHVLIGPAYRS  
EESVKAALAHELAHLQHLKLPKDVPRPAGAVRSVLLPLEVGAEELVLRPEIG  
EVRIRMAQEEAREWRRTGDPILDLENALVAVPIRLAARRLGLDTSVQEPSIEDPELR  
EVKEELVKLARGVDPWDQSDVERYTRKSVSILLDWLLDQDRHHSTSDSNNRKPS  
EFRRR

10 <SEQ ID No.:0790;PRT;Methanopyrus kandleri>  
LVRVAVIRFPGTNCDEMAWAVKLAGGDPEFVWHEDGGLDDFDAVIIPGGFTYGDY  
IRAGAIAALSPILEEIRECAEDGRPVLGVCNGMQILAEALIPGTTLTVNVGNRFICDWV  
YLRVERTDTPFTTKYQEDEVIRVPIAHAEGRYYYENPEEIEDNVVFRFCGPDGDVSE  
EYNLNGSVGGITGVVNDGDNVLGMMHPPERAAHRLLSDDGLRFLFESLVEWCRS

15 <SEQ ID No.:0791;PRT;Methanopyrus kandleri>  
VTQLVTVEVRVSLKPKALDPEGETVKRALHRLGYEEVEDVRTAKIYRIELDINDEEEA  
VELVDEMCRLLANPVVEDYEIEVVE

20 <SEQ ID No.:0792;PRT;Methanopyrus kandleri>  
MERGRLVYEGKAKSLYEHPEDENLLVMEFRDDITAFNMEKMDTVEGKGVYNCLISA  
RLFVLEDAGIPHTHYVELADERMVERLDMFNLEVICRNMATGSLVERLPFEEGEK  
LDPPIVEFDYKSDEYGDPMVNMMDHIRALGLATEEEVERMRELTQVNEVLSEFLKD  
CDIILVDFKLEFGVNPDPGEVVVGDEISPDTCRFDWAETEEESLKDIFRKDEGDVLAG  
YREAAERILRGDEEKLAMPLG

25 <SEQ ID No.:0793;PRT;Methanopyrus kandleri>  
MPFLLEGARQLKTIEVGVAYGKDPHAVVEDAIDQLTEDPNLGLVFFSPKHIEEIESAV  
GSLPEGCKVIGCSTAGELTPDGYTYGTIVVALISSPYLAVETHRITFEREDPKHAREI  
GRNLVLGAMEKLNRNPGPCLDINFNAMLTSLSEGRPIRALPYFIIELVEGLVPAIDYYM  
DGINEVVQKYKFLEVYGGAGDDLRLERTYVLEGRITLCPEGSAAVAFGSTALKIGG  
30 ALECGFEPVYEDRFPVTKAVPEERRIVEFDGEPAADYYADVVGKPEELDDSVFM  
WNPLGWEIFGREIIVREPAFVEDDGSMIFHSRSPAAGALIRLEPTENMRETARRVT  
ERAMRRADIRDPEEIALVLVFDCAHRDCDAQYDAIREVVGDDVPIVGFKTYGEHGQ  
LESGPVGHFNQTIEVVDR

35 <SEQ ID No.:0794;PRT;Methanopyrus kandleri>  
LTSTSVVIVSREITKGVSEIRVGLVIHGPTVIDTGWAERILRSLKRLGEVRAKLGTTG  
YVALLDAGLDSVVEFDRKLPSECLSELNEWADVLVLTNHGKSRESGLAFAEQVLSR  
AEGVDSLVAERPGEPPGGIVLWNPGBAERTVAEHLREDLGLKITEVVRTVTEKGG  
GIGKSRRVACVEPGDRILVNGITVGAESRNVELVFDDSGYLVEIRGGRIKPEGVER  
40 LGRVDPERVVKTDRRLRTERPERKRVKSGPERIHRVLLVDHDAERKVEDMRRSD  
AVVSVGDDTTCVCAELGDLGVWVIGLVLDLPDGDWVRDDTRESLRSENLAALLV  
CERDDDAGKLVRGRFFRDREMRVLDPPVTVGELVEEVKECVKEVLKCVYHKAKET  
SA

45 <SEQ ID No.:0795;PRT;Methanopyrus kandleri>  
LNLRELARELRSFEGVTRKHPVKTVEGLLEPLDVTTFEGEVIADVGEDAAAVKVGDD  
ILLIAADGIWGLIDRDPWWAGYCAVLNVNDVLAMGGRPVGVLNVLSTSDVDVCR  
EILEGMREGAWKFSTPVLGGHTHPDTPYTAVDAAIVGVTDEEHLVLSSTAEEGDLIV  
FVIDLNGRPYPEYPLNWDTTTMDKPDYLRQMEAVVEASKLVKAGKDVSNPGLVG  
50 TLAMMLEASGCLGAEVWLD SIPKPEDVDMVTWLKMYPGMGFVYAVDSERDVRAIR  
RVLS DARLEVSVIGEVTEDGWVKVSEGDESARVDFDFREDRILGVSPR

<SEQ ID No.:0796;PR1;Methanopyrus kandleri>  
 LRVYVDGEPVDVPEEATVRDALEAAGVSVPEDEVIAVFKGEQKVERETDRLRIMLET  
 GDEELSLTVAVEDERMSEVCEELPGASVSWTTRDEVGLGPVDVSDLEFHTRRGVE  
 VPPYTAILILPTNDPSEAYFLITKRRMAVEYICTDIHGRVTAGRELVDLGGGERVTH  
 VEPVVERATERVSVRVTLDDEAGDRIITRVEIELEKNAPVSAEHLNNTLEMEEGRL  
 RIKFRDTFTFSIEPRPFYDLPEENVDMRERGVTVRNRGVDEGVVYVYRRDRTPVE  
 SHNVVGRVRRGMELLDVVAEGDRVLVETDPPRVNFVGLTVDEARELAEEFDVELE  
 VNGDGDVVVDQEPRETLNVLKERKVRVEVVPEDEVIEIELYEDDAPRSVEYFRRVT  
 KMLDRPVGRLKVHFAYADLGMIVFEGNEKLGGKLPENNPKDRVEAGVLGVTNQA  
 KPHAGLIGVRLEDSEEYGPTGETFEFTNVIGRVVEGLGRLREMDQSDMGRTVYVR  
 EVRGER

<SEQ ID No.:0797;PRT;Methanopyrus kandleri>  
MKVLVISPEYYTYGAIIVAGVCEEHGHSTILRRSPDPEALKRADVLILSLHTTTLHLLDE  
DILEIARQAHFEFGKPVIVGGPVVSQVPELVLERFPNAIVAKGEAETGLPPLLQTLEDEG  
DFEDVEGIALLRDGEIVDTGWPPPADLDGPSPLKVPRDLGRQDVRGANVYIETHRG  
CPGACTFCQVPEFFGRRVRWKPVEAVLEEVRRELTRGGARRFAISGGTVTTYGDDE  
EDFVELLKRLADLLGRENVSAPDVRADLLNERLLEAIRDYTIGWIFLGIESGSDRILRA  
MRKGITVDDVCEAVELARTVGVVRVAGSFIVGYPGETEDDLEATEELLTELNLDDVFI  
NLAEPIPGTELGRVLTELPEEEIPVLRPGEQLETEAGDRALQLQLTAFTTLSRPVPLT  
DDVFHEALHNIREDERKVLRI TRFLRGAQGCTG

<SEQ ID No.:0798;PR1;Methanopyrus kandleri>  
MRIA ILGGTGAMGR LIARELRDDGHEVVITGSNPHTAERVARELDVEAAPT NVDAAK  
DADVVVVSVPI SVTEDVIREVAPHVPEGSLLTDVTSVKVRPVRAMLEHAPEDVYVLG  
THPLFGPTVPSLRGQTVILTPTERSGPWTRRVRRYLERK GARVVETTPEEHDRTMA  
VVQCLTHAVLLAAGAAIGRFLPSLELDIEEVASPVYRLLMDVVGRIAGQDPRLYAEIQ  
AFNPYGD EAREELLRALRRFHEHAHDHNALTEYIAESRERL GRELDLEACQRRTDK  
LLSYLADELRI LQEGIEAILLDVYTNEALEGEVTGDRD TIRLDGRELPRDRYKILPRCP  
KELAHFDGEVTVLELRTGADPGDVA AVVDALGRNLRALRAERRGERVRVEVEYTG  
KESLEGLLRKLRALGLEVRVAR

<SEQ ID No.:0799;PRT;Methanopyrus kandleri>  
VRSIVTSEHGGHYLTEEFEWKLTEEVVEPGACALCGTCVAICPGGIIELTDEGPRLTE  
ECARKGTGNCHTVCPRVDTAAYHLGLRIAGRDYEPLTGGYRRAVGAVAADSDLRE  
LGQDGGAVTALARYALEEGLADAVVGVTAGSAWKPCVTVVEDPEKVKDLAGSKYT  
RVGLVEALAEAADRGIERVLAIGLPCQVNGLAKIQHFEIVAKGARALRNIDGSPAEL  
PEVVATIGLGFCTKNFEYEGLVKLLREKGVNDIEDVERFDITSGKLRVEISGGETKEYDV  
KEFEEAIEPEGCRICNDFTARLADVSVGSGVTPEGVTTLLIRSETGEELVEGAVEAGY  
LRLRDVNGSDVRRLAKLKKCDWAMKEAKNRLKEGRKVPPFWVGDYGGVITRADG  
TFAVRLKVGPGWVDDPDIFRAISGFLEEGYRAKFTDRQQLEIHGIPATEIPEVVERL  
RETGLNTGSEGPLVRTIMACPGKDNCSGILNTEELARKLEEELAEPTPYKFKIALS  
GCTNSCVRPQHHD LGFAGAVRPGVDPEKCTGCGQCVDACKVDAIRIITVGGQAAV  
ADTDYKRCVYCGKCINVCPEEARYAEKEGIIVWIGGKGGREPVEGARLDVFADPDSI  
PTIAHTVIETYRELAEPPQKERLADTIRKHGLRQFTEAIRRVLSQ

<SEQ ID No.:0800;PRI;Methanopyrus kandleri>  
MLADVPPFVTVRRNLNVTVRDVLRCVLGLRDVEVDITYFALLERGEATVYDLAEELDRD  
RTTVQKALKSLVYAGLVTRRKETRPRGGFVYVYKAVPFEEARKIVLRALDEWYEAV  
KDALERADVPRSGPE

<SEQ ID No.:0801;PRI;Methanopyrus kandleri>



VIQSPDGTYYVRLALPPGFVKAEILRTVAELAERYASGEVHITVRQGLEIPEVPPSKL  
DILLRLRELGLEPGSTGPRVRQVTCPPGTRTCANALTDVPPLARKLHEEFLDWWV  
PAKVIAVSGCPRGCTRPSENDLGLVAVGGDEWELLVGGYRVARLPEQDVIDAVEL  
TLEWYASEAPPGTRLHRFVTDREVSELRDVLERL

5

<SEQ ID No.:0802;PRT;Methanopyrus kandleri>

MLPMLFTLLLAGPSQAAELGPADVPGPGTASNPPALALQSDHALIAWKSPEGLGIA  
VAKADGRVLVKTGIRTPVASYPAAAPWRGERDLATFVLTVPLMTPEGPRIDVDLVEY  
SDNVCAVLWTGLSVRGDAAPVVRVDDSTFALVYRCEGKLRVRVFGNVDGWVRWI  
10 TDEQQQPVELKLSAPGPVERFSVSVAGRPVTTYLLVAYETPAGTEVVAVNLTDPAH  
PTIDGAPIVPVGPTRPVLLDNVLAAYVGADGVHAALLVKGTAWKIASDVKVADATDVRP  
AIVSYGVDRLIVYGGSELRAAEVRIEGTRLGVVREGTLIKEPGYSPTGIGVVRTTER  
SLEVAGVILAFYARDGEPTVHVEYSEGLGELPTQHRRRPWWIVPLLLAASIGAYIGLK  
LPVYGQFLWLIISRARREVPKHDP

15

<SEQ ID No.:0803;PRT;Methanopyrus kandleri>

LELEPRTVVLRLGHRRERDKRITTHVCLTARAFGAAGVLISGDHDESVIESVEDVVE  
RWGGPFTVQWVGWRRVIKDWKRSGGSVVHLMYGLHIDDVIGELRGENELLVIV  
GAGKVPAEVFELSDYNVAIGHQPHSEVAALAVFLDRLYEGKELHREFERARLRVVP  
20 SEKGKKVERL

20

<SEQ ID No.:0804;PRT;Methanopyrus kandleri>

MTVEIAVISDVHSNLEALKRVLREVRSDMLVCCGDIVGYGPRPVECVDIVREWCD  
RCVMGNHDYGVVTGDVAYFNIAARIAVEWTRRQLDEDREFLAKLPKTERFEVEGV  
25 SIFLVHGSPRPDIWEYVFPHTPRQLLEKLVDKAGTDVLMIGHTHVPMYDEVNGSYVL  
NPGSVGQPRDGPRAAFGILEVSNGRIVSWDVHRVAYNVDRRTAREIEERGLPEELG  
ARLYRGV

25

<SEQ ID No.:0805;PRT;Methanopyrus kandleri>

LDPHETMRRALREGGVHRVRMSEPGRRLVVDVSGPYLRYPIVTAFAVARRDDGAIVE  
30 LVAFRDESVDVIETALAVEHREKGRDILVDANLKPLEDMYGVEADKEEVDREVYAKV  
HPELHRLLGSEWLSVRFFGPTVGLGSGDVPTLVTRGLGAHIVSELLGEEPAFIDDGE  
KTHRPYQEVPPERVEWVLAELTARGYGVVFTKPAVEVLYTLCREGYASPDREVVV  
YRTQRSWCERPESWPRRSIAERNLEALEYGLELLRDV

35

<SEQ ID No.:0806;PRT;Methanopyrus kandleri>

LQRITIVALILSIAAVPGSADLMNPVYLTGTLAHELGHALVEAEYYGGIDEVQLDVFPF  
KILFHCRDGGKCIDIAEPPIGFVTRGPYDPGTPEEELRKRHKEAMLLYIEDPARFFDN  
VSREDAEVTMAGPVVGALISAALSPLDPQGAFDSDAWNLLNLMPEIHGALTDGKIA  
40 WEALIRGRYPVERYLIELGLVTLVLTAAQCPRYALETIESDFVLTLELAPIALLDDL  
SKAVLGNLLGLAVKLREPFFVPGIWWGVNLSLLGPDHRKWLFALLDALGWTLVIPW  
LDMPWKLYAILKLIDATADLDPGYPSLGSYLGRKVPFIVFLLVSLLQCHPFLEDKSG  
IIIMEGSRLRRNGPA

40

<SEQ ID No.:0807;PRT;Methanopyrus kandleri>

LITLTDFGLGSPYPAQVKAVILRIAAPGVDIVDVTHEVPAQDVVAGSYVMSVACPW  
FPPGSHVGVVDPGVGTERRAVLLEAERGDFLVGPDNGLLIPLAEELGGIVRAFRIL  
EDEVSDWEVSATFHGRDVFAPAAARVASGESPERFCEPLDPEELVEPPIAEPEVDD  
GHVRAQVWFVDDFGNIITNVLYDEVLDLPETVTIRVSGESFEARHVHTYGEADSGDL  
50 VVLRSSSDHLEIAVVEGSAAELLGVSTADRLEILY

50

<SEQ ID No.:0808;PRT;Methanopyrus kandleri>

VFITSKEMRRIELNSRWLGFEEDFMMENAGAGVARVVIGEYSPNDVLVCGTGGN  
GGDGFVTARHLDSEGVDVDVLLVGRREAIAKNEAAELNLRRLDRAGIPVQEVDRSED  
LESVDFERDVVDALLGFGIRGRLREPVRSAVLRINEASRAGTRVVSIDIPTGLDPDS  
GETPDVAVEADLVVSIHRHKRGVRKLRDVFLLRRVNAGIPEIAERICGPGDLITSDIWR  
5 RDPWVSHKGQHGRVLIIGGSRKYVGAPQLAARGALRAGVDLVFLLTVDAVPKNDPN  
VIYRAVPAERLEPEHLDEVDLEGVDTVVGPGLGADADSVGILRELAESFDGMIIVD  
ADGLRGISGVNVDDRFLVTPHAGEFRREFGEELGRSLEDRSEAVRRVSEELGCTIL  
LKGRVDVIGSPDGEIRWNVGTPTAMTVGGTGDVLAGVVAGVAARCREGFEAACIG  
AFVVGSAAGCLAERRLSQGLTAEDVAEYVPKVLNRPWAAEPEAVTEVRRD

10 <SEQ ID No.:0809;PRT;Methanopyrus kandleri>

VEVHELTILGGTDKDGPEPVXELTLERGTIAAVVGLTGSGKSALLRDVEILAQGDTE  
TGRRIILLDGEEPSDDLRFDPHEHRLVAHVTTQTMGFLADCTVREFVEIHAESRGVDVD  
PEEVVDVANRFTGEPIDPDMKMTLSGGQSRSLMIADVALISDSPVVLIDEIENAGIC  
15 KHEALDELTARDKIVLLVTHDPVVALRSDFRIVMRNGAMTEIVETTQREREVAELLER  
VDTWLLDLNRNVRRCGERLDDVEPPAGIET

20 <SEQ ID No.:0810;PRT;Methanopyrus kandleri>

VKLIVVSGTPGSGKTAVILHALERLLDQYNPAVVKVDCLRTDDHEVYRERLGIPATD  
ALAKDMCPDHFAAYNLEHMMVRWAEHAGADLLVETAGLCCLRCAPYVDACLGVCVA  
DVTLGPNSPAOKVGPFLQTADVVCVNKGDVLSQAEREVYVRKVAEVPNPCRVIETN  
GLTGAGCELLARLIEEEAPELPDITLDEVRLREKAPLAVCTLCVGETRVAERYHRGVL  
RRIDGFTEYRGE

25 <SEQ ID No.:0811;PRT;Methanopyrus kandleri>

LTDSRSTEVSKLVELLPGFHCGACGYDRCDFAEALVRGEAKLDDCPYLQTERFAE  
ERRRLEKLLLEEIGEAEGARPSITGVLDGYEADLVLSPLPDEPACREILHPFWSEADIE  
EGDVIRYRPWGCPTTHFARVLDAEKGLLTVHIVGPRHRLGETDFEYKDVGLCLVVG  
FEGIVSEGRVPNVGETVRFVPEHCHMMQKVHSGVVIEAVGDRLRIECIDLKVVAPPK

30 <SEQ ID No.:0812;PRT;Methanopyrus kandleri>

MRAVPRCVCVLEIAVNTVERAVPEDRQKEAILAATERVSELYRMEPTPQPPRLGT  
EAQRTVMKYSEDPDPYREEKRRANERAAAVARELESLENIEDPEELLKRAAAAIV  
GNTIDFAVAGHEFDLDELREEISSAEFAVFDLKPEDLRGARVLYLCDNAGEIALDKLLI  
35 EVLVEELECDVVAVRGGPIVNDATREDAEQVGITEICDVIDTGAEMLGLLATEVSEE  
FAEELSSADVVISKGQGNFESIPPEPFPDVPVYFLLRAKCEPVAEELGVEVGSNVAL  
RWEPEDENVRRWREIVR

40 <SEQ ID No.:0813;PRT;Methanopyrus kandleri>

MRRQLPLEPVAAEKVEEEYELVTLLVCDNCDYFEFKPHDREVYERKKGKCPKCGG  
TLLVEGVFRTDADPSMFPSYKDVKSVERALESAGYEVKEFRVREDGSSVVFHYERK  
GDAHRLARKLAEMKFTAEPGKAGRLVQRFEVPEQEPGWLALLGLSVPVFAYLG  
GWLAFGSTWAAVEFALAFSAIYFGKEIAKLWVAKVEGLRPRLPFFLAVPPFPFPAFSS  
VIRSEVRPMLVESLCRVGVAGLVAGFLLSTAMFLLGSAFDHTPVRMLVWHNPWTLL  
45 LSRELGIVANPITLAGWAGLVITWLSALPVYPLEGGYILRYYYDTRTVKWFSVASAFI  
QGWLHWYHIAVATVIVLVKITAKLPSDRSFLDDDESKSWLPALLLVALFVLLISPAPF  
GLWPLEHSKVPHNLQWLFLR

50 <SEQ ID No.:0814;PRT;Methanopyrus kandleri>

MSPGVRALSVYQAELEKRIKSERRVQVIDVTDQVREKVRRESGVEKGIAHVYSRHTTAA  
VVVNEPESGLLRDIVNLEELVPQGAGYEHDRIDNNADAHLRALLLGSSVTIPVSDG  
DLVLGTWQSVLFVELDGPRSRRLVTVVGE

<SEQ ID No.:0815;PRT;Methanopyrus kandleri>

VELPSMKLP<sub>5</sub>SAHVEPLKLATAIVIALLLVKIMGRAARAVRGKLEEDLQDLGWWVEK  
TLLYGSYLLAFSIVLES<sub>10</sub>LGVS<sub>15</sub>LWALVTGLGLAGAGIAVAARDLIANLLAGLYLALERPF  
EVGDRIRVGEYSGEVVDLRIRCTVLKSRGRRIVIPNSVLVNETVEKLDDSDECEFEV  
VWEGSPGEIGRR<sub>20</sub>LALEKELDSLKLKYYEISVERVESGRTLVRVR<sub>25</sub>TAGKEVDSVHGA  
VRRALVKRPGGTDR

<SEQ ID No.:0816;PRT;Methanopyrus kandleri>

LVEINGVPVEDTFCEAFKGLYARFIVTAADERPLREAAENVAALPATVFG<sub>5</sub>ESEAGVE  
RWLDPEETPDGRPGFVAQMWVEYGDDAVKKLEHEL<sub>10</sub>GKRIRQGV<sub>15</sub>LVRPTTRV<sub>20</sub>FDA  
CEDPDGYIDTERPIGRCADGYEYTDVRFDR<sub>25</sub>EMVHVPIIMMGEFLIERR<sub>30</sub>LG<sub>35</sub>YAE<sub>40</sub>GVAG  
GLWVLFCEVDVALEAGYRAVEALRDVEGVITPFNVCAAGSKPETIYPDIGPTTNHP  
YCPTLRDRILDSKVPEGVEA<sub>15</sub>IP<sub>20</sub>EVINGVSLDVVKRAIGIAIEAATEVDGVVKVSAGNF  
GGKLG<sub>25</sub>DYRIPLRECIRE

<SEQ ID No.:0817;PRT;Methanopyrus kandleri>

VLDVVGLGALNVDELLYIPRM<sub>5</sub>PERDDSV<sub>10</sub>VERRVRRGGGSAANTICWLAHLGREV  
GFVGKVGSDDAGDLLREFEEYGVDTSRVVRGDGHS<sub>15</sub>GTAFCLVSGDDRRILVD<sub>20</sub>PG  
VNDELRPDEVDLDYIRKARVLHTSSFIGLRSET<sub>25</sub>SLET<sub>30</sub>LR<sub>35</sub>TKRTMKAVADELMVTFSPAT  
MVLRGWSYLEPYFEAADV<sub>40</sub>VLNETEAVHLTGDIEETLNRLAELVEVTIVTRGSDPAIV  
QEGTEISEVAPEPVPEEDIVDPTGAGDAFAAGFIEGILRGEPADRCCERGHAVAAEC  
LRIEGCRPPTEGRSE

<SEQ ID No.:0818;PRT;Methanopyrus kandleri>

MGTGGRGRPTPGLNVYE<sub>5</sub>VFLSLQGE<sub>10</sub>GK<sub>15</sub>FGVGE<sub>20</sub>PQAFVRFSGCNLR<sub>25</sub>CAYCDEPASR  
SSRRRALIRRVSGEVELELPVPCGPEDVVEVLVELEDLEDTFGTVSLTGGEPLVQ<sub>30</sub>P  
WGALKELIERLRERGRFV<sub>35</sub>LLETNASLPDRAPLIDELADVVSADV<sub>40</sub>KLPSHGPNMDDFP  
DRCLRFLERISA<sub>45</sub>EVYAKVVLVDEECYQHAESALKGLHRLGVEPIYLQPATGSEHDLE  
DLWELAGLVNADVRVLPQVHKLVD<sub>50</sub>FIPR

<SEQ ID No.:0819;PRT;Methanopyrus kandleri>

LPRVYLDGRELGLRFSACHVIPGHGKCGRLHGHTYHVSVELLGERTEPHG<sub>5</sub>FVYDFD  
ELKSTVRELKPLDHRVLLPTESELFEIEESGNEITVRLSDGKRYVFPREDVVLIP<sub>10</sub>TRS  
LSAEDLAEYLADELERRLAGDNLKELRV<sub>15</sub>RVDEGWGQGA<sub>20</sub>EVVRRLD

<SEQ ID No.:0820;PRT;Methanopyrus kandleri>

LPVVTIHYDKLVKILGREVSFEELAHNLIPMLGSDVERIDEREMVIETEFFPNRPDL<sub>5</sub>YS  
VEGVARALKGFLGIETGIPEYNVRRSDVEARVEESVLDARPC<sub>10</sub>CLAVAVVRGVEFEDE  
RDLEHLM<sub>15</sub>EFQ<sub>20</sub>EHLHWVIGRDRKKAAGIHD<sub>25</sub>FEAVEPPLRYFLADPNDRSWAFEPLD  
HPGEEMTPAEVLR<sub>30</sub>RHEKGRQY<sub>35</sub>AHLVSDGAPILADEEGVISFPPVIN<sub>40</sub>SERTRVTQDTT  
DLLIDVTGTDWRSVLDALHVIVCNLAERGAEILTVEILGAYERTTPTMELDWWDVPVS  
EARKLLGIDLSGEQLEELLERARHGAI<sub>45</sub>FVEGERELREYPLPDVYHIEADWREIPPIL  
YEEDVVRV<sub>50</sub>FVGP<sub>55</sub>RRTNILHEWDLIEDAGIMYNYDRFEPTVPDFYTPSRADREREFIN  
VVRDTLARMK<sub>60</sub>FVEVNSLT<sub>65</sub>LISPEENYRKMRLEPDGRAVKLANPIQKEYTIVRTWILPS  
LMRFLADNKH<sub>70</sub>RPYPQ<sub>75</sub>RVFELGEVIERDEDAETGAKDRWKLALAIAGPGVGFSEIKS  
VVEALLRELDVTGWEITERKHRSFINGRCAAVLADGREL<sub>80</sub>GFFGEIHPEVLTEFDLEV  
PVVGGEFDVAALRTAAGW

<SEQ ID No.:0821;PRT;Methanopyrus kandleri>

LEQIVKNALERVEREQGGDDPPSSRGTD<sub>5</sub>DDDQELMEVLERARARILVVG<sub>10</sub>VGGAGNN  
TATRLKEEGIGGA<sub>15</sub>EVIAINTDAQDLV<sub>20</sub>SCKADRKVLIGYELTRGLGAGGDPRVGEEAA

- 5 KEDMEKIKEVVEGADMVFTVCGLGGGTGTGAAPIIAEVARKEGALTIGVVTLPFSVE  
GRRRIENALEGLERLRQVADTCIVIPNDRLLIIVPDLPIAAAFKVADEVLINAVKGITEM  
ITQPGLMNLDFADVRAVMENGGFALIGIGEAEENDSESGSRAVQAVENALNNPLVDV  
EVSGATGALVNIVGGKDLTLKEAEVVELVASELSEDATVIWGAQIDEDLNDVLRVT  
VIVTGIEDADLEAMFTGPRQPKRTEVKEVAAESSRPEKVPEVSKGGAESSEDERPS  
SLEDLEKIL
- 10 <SEQ ID No.:0822;PRT;Methanopyrus kandleri>  
VSTYEELISLLRDCKRVLRAARKPTWDEYIESAKIAGLGILIVGGVGFLIRVIVQLIELYT
- 15 <SEQ ID No.:0823;PRT;Methanopyrus kandleri>  
LAETDSTKLYAVRVQAGREEATADMLVMRARRKVKEEGIETGLKAVIAPEELRGYVII  
EVEELTDELRLDIHDLPTRGIVEKPMDFEEIEHYFAPKPEAVEISEGDVVEILSGPFFK  
GEKARVVSVDSESRREITVELLEAPVIPVTVMKDALLREEEYEG
- 20 <SEQ ID No.:0824;PRT;Methanopyrus kandleri>  
MPKEEVEVLIEGGKADPGPPLGPALGPLGVNIQEVVEEINRKTDFKGMIEVPVKIIVD  
TETREFEVKVGSPPTSIIKSELGIDKGAHEPRHETVGDLSMEQVIKIAKMKFDDLLS  
YDLKTAAKEILGTCSMGVTVEGKDPKEVQKEIDEGKWDDLFEKYEEEEEE
- 25 <SEQ ID No.:0825;PRT;Methanopyrus kandleri>  
VTITEEDLIEPLRKVVEYSPRRFLETVDMIVNVKGVLDSDPSQRIDKEVVLPHGRGK  
PVNVCVIAEGEMAREAEAGATVINREKLEELAENVREAKKIARRHEFFYAQVDLMP  
DVGRVLGPVLGPRGKMAKPVPPNADIRALIERAHRARVRMRDQPVHTVIGARNM  
EPEQLAENAMAVLREITSELEKSWAQIDSVYVKTMMGPAERVY
- 30 <SEQ ID No.:0826;PRT;Methanopyrus kandleri>  
MGDCAMAVKAKGQPPSGYEPKVAEWKRREVKELKELMDEYENVGLVDLEGIPAP  
QLQEIRAKLRERDTIIRMSRNTLMRIALEEKLEDERPELEPLLDYIEGPVAFIFTNLDPPFK  
LYKLLLEESKASAPAKPGDIAPEDIVVEGPTPFEPGPVSELQQAGLPAQIQDGKVVV  
TKDITVLVKEGEEIDEKTAELKKLEIEPMEVGVDIVAIVAEGTLFERDDLIDFDEYED  
MAKEAAQHAFNLSINAAIPTAETADVIVAKAHTALNLAVNAGVPVPDETVMGCILAK  
AHGEMLALAGAIAEVDEEALDEELLEMVSRSAEAAERKEKEEEEEEEEEEEEEEEEE  
EEEEEEEEAAAGLGALFG
- 35 <SEQ ID No.:0827;PRT;Methanopyrus kandleri>  
LPHNVVLTGRPGIGKTTVCLKVRNVLEEEGYTVGGIYCPEIREGGRRIGFEIVDLTEG  
DRYLLAREGASGPRVGRYGVFVDNLERAESIERAVKRTDVVIVDEVGPMELKSNA  
FVDAVRRADAHTPAIFVVHERSRHPVVVDLREERPDVVRFRVTLNDRDELSDRILE  
HVLEWLEER
- 40 <SEQ ID No.:0828;PRT;Methanopyrus kandleri>  
LEHLECDVLVIGGGGAAARAAIEAARRNLNVVIVSKGAVGRSGCTVMAEGGYNAVL  
RTADPDDSFDAHFRDTEGGAYLNDQDMVEILVREAPKRLLDLENFGAVFDRNED  
45 GTLAQRPFGGQSKPRTCYAGDRTGHEIMMALLDEVRRLDGITVLERTMGYGLVRD  
HDGRVVGAVCVDLQTEDTIVITAYATVLTGGAGQLYPVTTNPVHKTGDGYAMALR  
VGCPLIDMEMVQFHPTGMVYPESVRGVLVTEAVRGEGRRLYNARGERFMKRYDP  
ERMELATRDVVARAIYREIKEGRGTEHGGVYLDVTHLPDEVIEEKLETTLKQFLRVG  
VDIRNEPMEVAPTAAHFMGGVPIDADGKTPIPGLFACGEVTGGIHGANRLGGNALA  
50 DTQVFGYRAGRAAAELALKLRRRGRRIQVRKTDAPTVESEIWSTVGQEDPIRVREK  
LRETMWEYVGLERSEKGLKTAIKTLNELKETVESGLDDEYGLRPVLEVRNMVEVAIA  
VARSAlyRTESRGAYHRSYPERDDKRWLRTVYRPNGLATRPakITRLDPRQ

<SEQ ID No.:0829;PRT;Methanopyrus kandleri>

MARSNRRGGRGDPEDDPAWAPPGHRCAGERAVGGPTVIPRAYLPAVPAGGNESR  
AFQGRFVDPWFSGIRTGYVIWDGGRLLGVTRNEPEHADVIDVDGIICPGFVDAHVH  
5 VESSGLRPARYAEIVVREGTTAVVWDPHEVVNVSGELGLEWAVKTAEEALPFKFYI  
ALPSCVPALGPPYETVEGEITVDVARKFASHPMVSVSGELMDVAGVMEGEKDEFIE  
LKSLYGLTVDGHAPGLTGFEAMRYFAAGPETDHECSTAEFTSRRELGVWTFVRQ  
GSSSKDMEVALETLEDLRGVCFVTDDLHVKMDDEISLRKIVGRAIEAGFDPLESLSA  
VTLNPSLCYGLQSGRLVPGFHADIVVEDLDENMELTDVWIGGKRSEVRFRDAEA  
10 ELPDVELSVDPREVSFQDGKYEVRVGLVRGSIREEIVREITVKDGAVKDDDDVAF  
VVTDRYGQGSWSIGFVEGFEELDCAVVSTVAHDSHNVVAGRRLLDDVRRALQLVS  
EVGGCVGAVAGDRAEFVRLDVAGLMSSSDPEEVKKSIEDVLELIRSSSGVDWDPF  
QALSFTLPVPELRLTDRGLVKVEPDEIRFVDIITDGDPE

<SEQ ID No.:0830;PRT;Methanopyrus kandleri>

MKDLLWWLLTVVYAPDFEKWMRWCPVCSRPLSYYSATDVHYPPLGSLLPALVW  
YIGTHTLGLSPHTWEFRVLWKVPAWLGAIMCIYLIRAGVGNVGTLVVAASMAYPC  
VFWQLDTISMVPALATAVCEGKLAGLCAATALWMKPTAGIVALPFLRRQSIPTFLA  
SVLICGPYLIANGWDFVHDVHIFQVNRSPQNCISWTLLPGCPGIEAAVGTLSVVVPLA  
20 MRGNPELAAGCIGLALLAFSKVNNPNYWAVGCPMVCLISWKQGAMVLSTAACFLTA  
SAVSIVTTKEYNAEDGRRYSIRELFIPPPPTDLPVGNAAARYLLGTSILYHFLVTSC  
LYIRNLRKLAVSS

<SEQ ID No.:0831;PRT;Methanopyrus kandleri>

VKRVLLALAVALAVALVGGAEAKVYSGKYTIKPIQSVSEAPSEVQLEKGQTTADVTV  
TATITWTGNYPYTIKRTPTTVTFAVDGQTVDTKTINPPYKLGDTRTVSTTLKLTGK  
TITVTAKFPDLPQYGITGGTATQSVEVTVAPKPAIPHTLAGAVVKDLLAVPALMLL  
DPFMGYPLSDMLGYKTDLQNFLDDLGLREFAENDVGAVLPAMVLATDLLAGWGLD  
HNVMPTLSMLDVGTMAAGVAPLLYALGVGDVENPLVDLAQELGLEGSVITEAS  
30 AVGLALPTVSTVLGYLADKGVATAAQIVAPVVKALDQLLTMLASPIAGYLA

<SEQ ID No.:0832;PRT;Methanopyrus kandleri>

VAKIYGDEDASLEPLEDKTVAVIGYGSQGEAQAKNLRDSGIDVIIGVREGGPSWERA  
KKDGFVLPPIPEAAEAGDVVHILIPDEVQPQVYREHHDNLEKGNALGFSHAYNIHYG  
35 LIEPPEYVDVLVAPKGPVGHMVRKLYTEGFGTPALVAVHQDYTGAMDLALAMAKA  
MGFTRAGVIKTTFREEVETDLFGEQVDLVGGVLYMILYAFETLVEAGYQPEVAYFET  
LHELKLVLDLIEKGLSGMLDNVSNTAEYGGLTRGKRIINKEEMRKVLEEIRSGEFAR  
EWTLENESGRIVMKRLREEIENHEIEKVGERLRKMMGFED

<SEQ ID No.:0833;PRT;Methanopyrus kandleri>

MPAPIEVGRICVKTAGREAGKYCVVVDIVDENFVIITGPKDVTGVKRRRCNIKHLEPT  
PEKVDIDRGASDEEVKEALEEAGLLDLMKEGIVSGS

<SEQ ID No.:0834;PRT;Methanopyrus kandleri>

LATVVMKRLIAVTLVAGLTILSFCGYESVAKAPTWKDAERALYHYGLCLVLSACSIRR  
VPGYSSVNILLHGYSSTSPSPVPLRWLAWQTAKVIGLSILLSGFPALVVKWILSG  
DPSRWVLA AAVLFGLVFKVRAFMSVLSQLAVTILDISEYRADKRLQLSALVSHGLRTI  
SLLLVLAVVLITYPVISLCLLPMIITLGWIAWYLHKMSRLPWKDHQVCRVLKNRLRP  
VLVSSLLLCVTFTLGLTTDYFTNVSVRIWEYVSGEHVRTVHTLVPAVLLDQTSRLRI  
50 AETHRADMSFLTLDVLRDRVVLIGGESGQATAIDPRTGRSLGSQKLPPELRESSVE  
ALTEDLEYAYPYLRAGLPVLYSGKLTVSGWVADVWIPFAGYTLMIPEITLEVGRG

FKPTEAPAFPGVDWGITWYPARLDGRIVPVVIPSTVCFTSSIRVPGSLVIPLYGPTAV  
RVWLHQPCFIEIERDRVYVLKPEYYPDGILMKVEKIRV

<SEQ ID No.:0835;PRT;Methanopyrus kandleri>

5 VITVVFTGYKGGKLRFLVLAEGDPEDGAEISIEGHLELSGGGEPVRGVLGGEPTPPDR  
VLSELQKADRKIALPDVAEVVDRVLGEKIEVKELCRRCLASDRVTVLKHGYRFGEVE  
VCGRCAREILEEELRFRVPGFSQTLLEKLERLLHELRLDIDRVVEMVDPAFDPAEEEE  
KTRWEIVEAEDEEEHRLPLTELDIPEELRRVLERMGYQELTPVQTKCVERGLLEGR  
10 GIGVRLQVGAARLKEFSGPERGSPRDADIIVGTYESGFDLLLRTGAVDPDDIGVVVID  
EVHTLADERGPRLDGLVCRLKTLTGAQLLGLSATVGNPEELAEYLDAEPIVHNRRPV  
PLEYHLVINQDRRQKWDRIARLVESEWETEYSTGYRGQTIVFTYSRRNTHRLADLL  
NERTGLDVAPYHAGLPYDRRRSIERAFERGELAAVTTAALGAGVDFPASQVIFESL  
AMGIEWLTPREFQQMAGRAGRPGYHDRGKVVLMVEPGRRYHRSQSETEDKVAFT  
15 LLESEPEPVEVEYDDEDEREQVLHLVSGAAKSPGELERVCEDES LGFAGDPMRRV  
KELREMGFVKGLEPTEKGRVAARYFTGPRTVHEL SARAGSDPLRAVASVRPFERF  
QLSPSIKRAVERVTRMSVPSRLDDALSVIHSEKIEVIERLPPKEKQKLVS LMKELDC  
GCDAFPHCEHVSQRASELALKVRLEGKSVYAIPRILEGRYGITAYPIDIANWLEEVVR  
LLECAGEIAEEPMAAAAALADPWSER

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<SEQ ID No.:0836;PRT;Methanopyrus kandleri>

VRRLVLP TLLTMVFLAVPATADTTATTPTAEVSTSTQGT LQQVTQQTTQQEQTPGA  
SGELL PQVAPKALGYIAVGAILCAIPNRGTQELGADLTQLGAEALTAAAVDHGLPLK  
YPVAYQFNRTYEKLSSPMYWGEVGFNIVAPMLVNSMLYSMLQPLSEQLEVPPDVIK  
25 NYIVQTCKLMAKLQDRPVSPEDVIPVIDSAIQIINQSSNQSSQSKLTEDTKYEVAKTIA  
NFLNGIRGSSGVLIASNVCKFALRYINVEPSNGIKLWIGSVLSPVVPDVSGTISDVRNI  
TRDINNAMIGVRIATNPVETIRQITEDTGNIIETFRITIVKNADKLGISEETANEILDDLK  
SMISDLTSTITDEIVRPYEPVIRCLGIALAINSLMDAYNSFNRLTQRLSKLALIARGLG  
VQVPTLTNPEGELKRALGV LQQGRVGPPLPF

30

<SEQ ID No.:0837;PRT;Methanopyrus kandleri>

LIDRLAKKYLTPEKVAELGFQITEELALRALNLIRNL RTEAKLEGDSYSFRVWDEKDR  
YEISASGEFRGSGFTLEFEKRVLDTRVRGHIEVEGEQVTELMRRLLLEILKEGKES

35

<SEQ ID No.:0838;PRT;Methanopyrus kandleri>

MSGTQYRLIPVKSRYWKVGSGAVENALEALRGIELKDGDVLLLSEKAVAVAEGELID  
ERGYEPGV LARLLVILWMRVWVGRILGPLLMDPPMRRETIE NLRNYPLKDGSR  
HKQMILEEFGLLHALEPVSEAGCDVGNVPGYAAPVPESADRVARELREELRRRR  
40 GVDVSVIVGDTDKTYEILGILFTTVARAHPDIVTGTGVIGFLVGRLLAKTVGPTPIAIA  
DVSVREAIKLLDMAEDVRTKGAGRTVYDALEEVGDPESLDEEFLNGFEHVPIVIARP  
VTP

<SEQ ID No.:0839;PRT;Methanopyrus kandleri>

45 VEIQNIVASVDLKGEVNLDECSVILQGEYEPEQFPGLVYRLEDIGTVVLIFRSGKMVC  
TGAKNREQIYKSVREVRDLEKKCGVKFHGEPEVEIQNIVASIDFHVPLDLDTIAEVL  
VGDEDVEGIEYEPEQFPGLVLRRLREPKVAMLLFYSGKAVCTGAKTEEEPEKAVKKIA  
EKIEKYGLKLTG

<SEQ ID No.:0840;PRT;Methanopyrus kandleri>

50 VPVLGLGHNPVPPVSGFTAGARVLLNRHRETVGGSTLTRVLGIQLGNTGTDYCVMN  
EDGDWEIVAREEGVFGKISCVFTLEESRRALREEIAPRVIERVRRVNPDLAVVGTV  
ELGLILGPMIHEKTGVPTLAVYGDWPWGAPDGA VGAPYCVAAEYPNCVHVDVGAM

AVVTPIRDGRPDFGDAVSVSGTFPLDLAARELLGKEYDEGGKKAEEGEVDENFRRE  
LRSVDVDGKPVFGRVRGSLAPVPPEQERVLRDHIRDAGAPAEDVLRRTLVELVAETIV  
INAAQYDMDLLVLSGGGVKNELLKRRVSELWEGDVSIFAGEELEARGLCLLGLRYLE  
GEPVPALPCEGGTGRGGKT

5

<SEQ ID No.:0841;PRT;Methanopyrus kandleri>  
MPKTKHWHYSIPPEELDDERTAKAFIRELRISPKHAREICRAIRGMPLDRAKEFLRRV  
IRKEEAVPFRKHKKKVPHRRQIRPGWDAGRFPKEAAREILRVLEHAEANAAYKGLD  
TDRLYIKHIAAHKGRVIRGWIPRAFGRATPFNTPTTHIEVILEER

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<SEQ ID No.:0842;PRT;Methanopyrus kandleri>  
MVMYGENVPVHKKFVQYGMLKTELDEYLEELGRAGYGGMRLQRPVNATKIIAYV  
ERPAIAIGRRGRNIRRVEEEVQERFLLGRVSIIEVKELPSPELNPRVVARRLASALER  
GIHFRRAAAYGALRRIMNAGAKGAMIILSGKLIGARARTEKFMEGAVKYCGEPGDEY  
MIEGYVQAVTKPGAIGVTVRIMPPDVELPDELEIRPPEEVEDELKELIGKSEDEAEGA

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<SEQ ID No.:0843;PRT;Methanopyrus kandleri>  
LGKFKLRPDEIREMTPEERREKLKELKAELLREMTSKSISGVPDNPGRVKEIKKNIAR  
ILTTEREEELRKIRETEKG

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<SEQ ID No.:0844;PRT;Methanopyrus kandleri>  
MQEDDICPVCGLPKELCVCEEVSKETVEKIKIYTEQVRPGKVVTIIEGLDDAGIDLQE  
LASKLKRECACGGTAKEGKIILQGDHRNKVREFLIKKEGFSEDAIEVT

25

<SEQ ID No.:0845;PRT;Methanopyrus kandleri>  
LELRYRTPSGMSCLYLPRCAFPRSGRDAWRKKKQVETILTLLCSRLKPGDTVVDG  
CGRGTLTTALAVSSPSCDVLGFDIKEFETWTELERYVESVGLDNLEFEVNDLHETAK  
YGLPDDPDVIVGLHLCGTLTDRLLKLAVNSDAHFLVVPCCYGRASPRVIVEELGVD  
EGIERVREVLKRAESSVEYQLEVCRRMRGKFLEEHHGYQVHVGVAFPEEISGRRVFLM  
GIT

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<SEQ ID No.:0846;PRT;Methanopyrus kandleri>  
MRPDRTSETHTSVNTDSSYRRGFDLTLPSPPLPPDPPEELVGKKFRVVRANSRTYL  
GISGRVVGFTKNCLVYDDGGGDQKILPLRHIVMEVEGLRVDGRTLRLRLQEL

35

<SEQ ID No.:0847;PRT;Methanopyrus kandleri>  
LIIPLVGGVLALLVLAASVRIVNQYERGVLLRLGRYIGTREPGLNFIIVPFIDKMIKVDL  
RVVTQNIPAEVITKDNVPIKVDVAVIYYRVVDPVSAVLNVEDYEEAVFNLAQTTLRSV  
LGEVDLDDILAKREELSERIREIIDEKTEGWGIHVTGVEIRDVILPEEMRRAIARQAEA  
ERDRRARVIAEAEKQAAQDLRKASEVLGVNPGLLRTLQTLSEVSAEENVTIVIPVPI  
ELLKLLKEPE

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<SEQ ID No.:0848;PRT;Methanopyrus kandleri>  
VDTLSQELCLLLAGVGLIVLDCVLNTGIVAMIGVVCAWVGAYLMGTYLIATLPPGAF  
VLLMQVA AVLRRTEESSDVLLKSVGELKGEIGVIREDP LLVKVRGEPWRAVSKTRL  
RRGERVVVLDVKGNKLVVKRRKTGERR

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<SEQ ID No.:0849;PRT;Methanopyrus kandleri>  
VDVVIGAGPAGRTYAMILAEAGHEVLLDRNGKEGTGGKCLNEACVVLGALIEAARL  
VWAKLGIPGVELDVGDINFRRLTRSVRKVVETIRQRLIKETERAGVEILRAEAVKVD  
ESLNVTYKDGVDLEADRVLIATGSRPAIPEVEGVDSDAVFTFREILEMEVPSELV  
GGGPTALESFAFAALGSEVVLAYRSRILPNAPEEVRREILKDLELVGVNAVRAGEL

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RAIRETSSGVECRFERGATVADAVLLATGLEPNSDIAANSGLPLRKDGSVVDDGM  
RTPRDGVYAAGDVTGPPYLTVPARYEGTVAALNALGKNVRRGNPPAPRVIRLFRDF  
GRLELRGIDWEGSLPTPVGGPAFWMLHHGIKGMVCRKRGVTTEAFIVAPRIAPML  
PYPRCVEPDWRLIEVHPTDPVIGLLKQLGLRRTLGE

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<SEQ ID No.:0850;PRT;Methanopyrus kandleri>

LGKVLVTTALAYTNGPLHIGHVRSTYLPADVYTRFLKMRGIDAIHIGGTDNHGVPIAL  
QAELEGKDPEEIVEKYHEMIKEDLERLNIHFDEFSCCTREFNPDHVDMTQWFFKRL  
YEAGYIEEREVEQLYCPECERPLPDYVEGVCPYCGAEGARGDHCEACGRYLEPV  
10 QLEEPRCVICGSKPEVVRTMHLFFKLSEFEEDLKKWLESNDNLPKNVRNYAIQWVR  
EGLKDWDIVRDLWDGVPVPLEGYEDKVIFYWVFDAPIGYVTFKQYCDRVGQDWK  
DYWFSEDTKIVHFIGKDIIHHALFWPAMLMGVGATLPYTIVAGEYLTLEGEKMSTSR  
GWVWWVKDFTKLFADLLRYYLIVVSPLTRDADFSWGDFRDRVNNELVANLGNFVY  
RTLSFIYRFLDGNVPEAETDQEIVDKIKETHQVRTEHLEKFRFREALTEVLRLSKFGN  
15 EYFQEHEPWKLKDEDPERCAEVLRGCARIVKALAVMLAPFLPDSAEEKWQSLGYED  
SVHDVDWEEALEDVETKEIPEPEPIFPKVTEEDLEKAKALLPEESGESEGGDDEYVS  
LEEFNRLDLRVGKIKEAERVEGSDRLIKLRIDIGDRTVTAVAGLYPTYEPEELVGRKV  
VVLANIQPKEMFGVRSEAMILAVGDEPALLTIDESKREVEPGERIR

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<SEQ ID No.:0851;PRT;Methanopyrus kandleri>

VCFTLAAVVLISDSEIKWRIHDALYPMILGSTAEKDVMLLLHLGLLFLVLPYRSRIPLPK  
IDTWVTYALMAAILAVPPALQLLMIYEAGFNPGLTGTCIVTLTERPETSSFYHCHAVKA  
CLGALISAIFGEPKIEFHCGVPLSFVLPWPVPLVALLAIAYVWLAWIVPLRADRTEK  
AIVLSIAGSLLCLGCLDGGPLANPSVVGSLILLASRIRTVAPPIASLGVGLDFAFRQV  
25 LFYLPAYHTLTYLWTAFLSSLLPSTVDRIITRRSTLAVSLCLLGMVPHLPVAEPLRST  
LGLASEHDYYRVDVSNNGDPAEVRAELSRIPGVEAVSIRVTDGRVTACVKTKRGVKL  
QVPKARVRKIRGYILELRVLYGSPRDLTEALKSTDGVVGVLGVKMKMGSVYRVELGA  
EVDREVNVLVPSMVKQLRRHGVVVSRIVTFDVARCIWG

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<SEQ ID No.:0852;PRT;Methanopyrus kandleri>

LRTKIVAVLLISAIFIGALMGVITYQWSISSKGARVGCYHVAITNVKGSVEPGDVKRAL  
LKCPYVIRVGGIRTAPSSCDAYIIVKAPTPVSKYDIAQELSQUALRKAGLGKAPAVFLN  
SVNAYVVEVAVEDPKIPASVAARKVASAPTILAIFKVERRGSVYVFEVASLEEEYPVA  
YSVTGALKLAGLKPVGVANVTPVKWGYVL

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<SEQ ID No.:0853;PRT;Methanopyrus kandleri>

LILCLALLILTSPYLAQMILQYNTPTYGLKAGTLVVVSGGSSVGETSSLTHTHSLKACV  
GKVMNYVIGIPTKYHYGSLSKFMPTWAAVIFTAAVIAASYVILAILSPLAVFHERGSA  
AESLLLWAGFLVVLGAVDGGFMCKPMVIGLGMVWALGPLPVRVYVIAVLIGLTP  
40 MLLQATIRVWYLTSPAPNSVWVAVALLMTAARGQGW

<SEQ ID No.:0854;PRT;Methanopyrus kandleri>

MKAFSLVEPSPAKNLLPVWERLLEEGWEVTYVYGHGRGVEILKWEGIETKQLGKPRR  
RQGLLGYYVGFSDLIRTVRALASERASVVLSSGNTGDARKSLIASRMLGIPSVHLEM  
45 DVYNPVEAVRWATRVLVPFSEKWAEVLRKRRVGVETKVVSGAPLAQYLADRHLSGR  
IPGPVPEEYEGRVLVCLGGDITEEGARRLLSDLEDHDPVVVPFRVSPPEGFEVRE  
FVDLPGVMMMLADTVVFAGGFGVTIEACVVAKKAVKVSEVHPKHLSHWIAEESGVPV  
MYLSESSGAEDAVQMARKPRGEWLIRGRSAVAEIVEEILEVG

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<SEQ ID No.:0855;PRT;Methanopyrus kandleri>

VNSVRTADVKTTRTKETEVEVSVNLDGSGRAKVDGLPFFDHLLHQFAFHGRIDVEIK  
ARGDLEVDDHHTVEDVGICLGKALNEALGDREGIRRIAWALVPMDEALVECAVDISG

RPYFVLKGYRPRNRIGSPPLSTENVSHFWKSFCDHAGVTMHVVVRWWDNDHHAI  
EAMFKAVGRALGAAKEIVGDGPSTKGTLLRRG

5 <SEQ ID No.:0856;PRT;Methanopyrus kandleri>  
MERTVSIVCIVLGAALLWMSSGASHQVVGARELQSTDDGTLVRVKGEVLQVNVVSD  
GAEVVLDAGDGTVTVFLSREASTLAPTPGESLEVVGRRVEEYRGRKEVRVDSPV  
RAR

10 <SEQ ID No.:0857;PRT;Methanopyrus kandleri>  
VWIRRYVPAKALIVVIITTLTVPYFVFYGKPRGPGYPTELYGYRIVLEDPALAVVDVEP  
RRTLLFRHTLTVSDEGWSVHPVFDIPPLIFVRAERMDTLETVKRNLWAVVLQEGAG  
RVFMPDEFVEGGVPLITGIAGQAWAWKHLKWAREFGVIHGLRRYAKEVGPERIST  
AILEEYRRAPWRAILDFCDMMKNSDVGRFLRSRGLSFRDFTLSKDPKLVAEVLVLD  
LGRLDERVDERIRYVLDARAYPIPESEEKIVDKAARELLRHG

15 <SEQ ID No.:0858;PRT;Methanopyrus kandleri>  
MAASERNTGKFTTECPACGSAEIVFDEERGEYVCANCGLVTEDPVIDPGPEWRHF  
NPDQRQRRSRTGEPVKLRPLDPKGISTIIDRELDRDSGGKKNPRMRRIRTDARIKVS  
GSRERNFFQAFLELENLASKLQLPESVRELAASIYRKAYKEGIVRGRGIESVLGAADF  
20 AACKEARVPRTAREIAEALGVSDENEILRAYRVLQRRNLKQKPTPSDHLPRFASK  
LGVSENVQAKAQEIIKAKEKGITVGKGPAGVAAAALYASILEGERRTQKEIAEVAR  
VTEVTIRNRYKEICEALGIELHP

25 <SEQ ID No.:0859;PRT;Methanopyrus kandleri>  
MRRLGRALHVTPRGNLIARADHVPPLGAPVVTRRRRERVGVIVDVFGPADKPYVAIR  
DKSRHHLERFVGKELFIPPRRRRRRPPRRRRRGRPRRRR

30 <SEQ ID No.:0860;PRT;Methanopyrus kandleri>  
LPCRTHALKLRPTCHPPHRTLRSRRRHLEPVRPTPILPGGASVQVVRRIEIDRTRC  
EGASCALCVEVCERGVLKIKGEEVVIADLEACDACDECVRVCPNDAIDLRYRERQ  
FLSAMVRAMHGDGDGLEVARRVMMRGRDVFVGTWFWYLRRELERTCRIKREAELE  
GKRAKLYECTCKVCGKKFKSNKKLDVCSECANR

35 <SEQ ID No.:0861;PRT;Methanopyrus kandleri>  
LNRQDPIEKTKELFIKVSRLGEEQPEISVRREEDPSGHILNPWVANSEGADDVWPL  
VFEVRSKDGVAAREFTLLVPVRLERRRLREILLKVFRS

40 <SEQ ID No.:0862;PRT;Methanopyrus kandleri>  
LYPRGREATLA AVLHTILRDRPSTQKEIAEKVGVSRRYVTELLRPLIEEGAVRRTYTV  
DMSKLRRHFPELFEELGNFLYEDVEMHLEGVRPYFKRMTDLTLEQIETALIAVEENP  
EQAPKVIEMDEEVNRLDEEIRLYVRTLPVLHPCEEAGKVATLLLEISHCIERIGDYAC  
NIAEVAETLGTLSDLQCWREVREAALERSMVKTAYSIFLGRVKEEDLRHEAEKVYC  
AEDRVHKNIRACEKAVEETKEFPEKADRLFGLSRITKDIERIADKAVDVVDFTRELVE  
GRPRDLTPEQEMRSTLPADGTH

45 <SEQ ID No.:0863;PRT;Methanopyrus kandleri>  
LYYIGLGGFGCRFSTHASNAGLEVILCAGSRGDLRVSEGEKIEVASGIGFSRDWRK  
ASEELQEQAETIRETLERVGAEEPTVLAFLGGAAGYALAAQILKEPPVPFVLTTP  
GESEDPQVRRNAAEQVKSVLGVSILKLPVLWVDNALGGYERNRVLERTLLDLRDFL  
50 GVPVEELPNLAGNYALSPSISGEKVTGDVVKTSADDEVRLVKLSREPEEHVRRERR  
GPDPESLRELF

<SEQ ID No.:0864;PRT;Methanopyrus kandleri>

MARKARVTLTSEDALARVLATKDALEGDSISATVGKLVKFGFAYLREKFPPELFEGIN  
LEEYREKARERWFDSSRS

5 <SEQ ID No.:0865;PRT;Methanopyrus kandleri>

LRAPEGFLLGGIKREGIGVGLIFSERRCAVAGTFTENTLRAAPVEHSEEVC DRGVAR  
GVIVNSGHANAMTGEEGYQDVLRTAEIAELMGAPEDIVVCSTGVIGERPPV DKIV  
RYAREVWEDIGPTERHVREFSRAIMTTDTEEKIALYEGDGWSLLGIAKGAGMIHPN  
MSTMLAFLLTVDGAKPKELQMWLRDVNDTFNMITVDGDESTNDSVLLANGSSNL  
10 KVGSDVTITEFQRALEEVC TELAEKIVRDGEGATKLMIVCVHGASNEVEARRAARAI  
ASSNLVKAALFGENPNWGRIGAAVGAARVDVDPDELRIAFRSSEGEIVTYEGGPVD  
FDEEKAKRVL SASEVEIVVDLGVGDASARAWGCDLTYEYVRINAEYRT

<SEQ ID No.:0866;PRT;Methanopyrus kandleri>

15 LTDREEVVELRGHIIDSLIFSRVLDTIMEMGGDFEILEFKVGKRKTDPSFAKILVKGKD  
PEHLREIVSEL RKYGAVPVHTQEVRLPAPADGVCPRGFYTTTNHRTFVLFDGEWI  
EVEDIEMDCAI VVYPEERRAVAKPIREVREGELVVVGDRGVRVKPPERPRGRTGIF  
GFMESEVSPEKPTPTLIRRIAELEWHRKNGKIVVVVGP AVIHAGARDDLAWMIREG  
YVDVLFAGNAVATHDVEASLFGTSLGVDLETGEPVKGGHSHHLYAINEIRRVGGLR  
20 EAVEKGILKDGIMYECIVNDVPYVLGSI RDDGPIPDVITDVMEQAEMRRHLKGATL  
VLMMATMLHSIATGNLLPSWVK TICVDINPAVVTKLMDRGT AQALGIVSDVG VFLPE  
LVKELKRVRDDEA

<SEQ ID No.:0867;PRT;Methanopyrus kandleri>

25 VSERDTKKYDMI IPLGV PADVIAEVERRC DVKV VQREIERGGTKTTVLA FRGTKDAL  
EEAKKVMEE LIERRVEEWTKPRRRGPS

<SEQ ID No.:0868;PRT;Methanopyrus kandleri>

30 LSEKSSRKERDEKTEKETARQ GKHRIRVKS RHYEMPFSRGVLARSLTAIGVEPHK  
AYEIALKIKEELQDEGIEEISTDELADIIRTKLEEIDETLAERYELWRRIKKREEPIIVLIG  
GASGVGTSTIAS EVGHR LGITNVIGTDAIREVMRRVLAEELYPTLYESSYTAWKRLR  
YEP AEDPVITGFLDHSEP VVGIEGVNRSINEGIHVIVEGVHIVPRLIKKEILNYPNVF  
VFMLAVEDEE A HKWRFYARS RDTKLSRPAERYLKYFEEIRRIHDFLVEDAE EHDIPVI  
NNEHIDETVDQIVSYISSKLLKGERELSKSVSWW

<SEQ ID No.:0869;PRT;Methanopyrus kandleri>

35 LTFREKLRGCKVEELMTKDPITASPQVG VIEAFEIMLKHDVGALPVVDDEGR LIGLVT  
RTDLGRALLEDEYEP GTTVEEVMERDV VVHPDDTLLEALKRMTSAPEGIYNQLPV  
VDDEEKL VGILTDGDILRWI AKKL

<SEQ ID No.:0870;PRT;Methanopyrus kandleri>

40 LFGWIRRHRKSIVTAGIIFLAAMMVLSAIP SFMMGGQSAVAAAEGTV DASIVKD YQV  
SVVRYLAVPKPGVK TSDVKS AVSSAGGVENV DV RKVKIKGYTVFVVDALVPLTADP  
EDVKKRIEERLKD KVL DARGTVIKGSKFVFQASYD GKP DVNAIKRAIRRELGNRLMD  
45 GPKLK VRYNAV VGEVLCNVSDGKHTLIEERIERALHSTGARGCLVIEQLIARLG TAKL  
TLLGPGKEKVGDR TVNFGDRMAMVLV LPEHAKSKHLTLALWISNSGGKQRIYV VDR  
DILRGKYIVF

<SEQ ID No.:0871;PRT;Methanopyrus kandleri>

50 VYEVEVKVKLKNPEDVRKRLEELGEKVRTVRQRDLYYQHPCR DFAETDEALRLRCS  
DDKVALTYKGPKV GREKSRVELEVVD DFETTDAILRH LGFEPL EHA EVKKLRTVYT

LEVNGEKVVAALDEVEGLGTFLELECKADDESEVDEKEKLLVSILEELRVEGKRVRH  
SYLEMLLDQGE

<SEQ ID No.:0872;PRT;Methanopyrus kandleri>

5 LPSTGALIHVARWTVLAAALGVVGGACAVAISSIIISTVEKAVGNEPLVIPAFMLLAGSL  
AALHPELRGTGMEIIVRGFPNEPANPIRGMALVLAGLVIGGGGSGGQVGPACQAC  
ASVGGYVASKLGMSEMERKWAVLGVISGGVAGVLCAPLAAALFAIEVLRVRSRYVV  
LFPSTIASLAGYSVYVSTLGKRYLLVRNAPYHYSPQHLPPELLVIAVVATLLAYVYSRC  
10 VKEARRLFVESVPSQPVRSLLAGLGVASVGIAIPTAVGLGLDYASKAALGRIGAEAL  
LSFLGKMVATALTVGSETPAGLVSPVCGAFLGLFWVKRWARPLRPEPRRLSLRS  
WLRRTLSRPLCWSSSCSASTAPSRPLWERSWGISS

<SEQ ID No.:0873;PRT;Methanopyrus kandleri>

15 LTVSAEGERGPCGRVRELYSNDKVSVAEVSVRGEGEEHYHRRTFEVYYVIDGRGK  
VVLNGRPVDVGP GDVVAIEPGTRHKVIGNLRMLVVCIPPFDPEDVYRV

<SEQ ID No.:0874;PRT;Methanopyrus kandleri>

20 VQPLTRRNKDEHPAVLDPDRTIVLGDVTVSRDAVIGPEVRLGPDAVVRGAVISGRG  
VYNCELGRCAVGP KTTVTGDVGDGVTIHSGTILGQLRVSGEIEPPEVGEGAFLGP  
GVSVLPGTVIGPESVVMPSDVVTERVPRRGVVSGNPAMPTGMVVD AETLILEFDGK  
RLLEGKRGTAFDVRLSDGELEITEESP DNFGAVLEKDVVKVVRMGMHAIP LAERPF  
SIPLHVLEVRTKG

<SEQ ID No.:0875;PRT;Methanopyrus kandleri>

25 VPVRESLLIDTVRRSLVLGSLVLEMCEVERAAVLGTVAQGKRFEHGVFVAGKRVPG  
EVITVEVEVSREVVRSGSMEIDLDPADPDLVAVVADVRATGLIANLTGLRPERRGFH  
ALFAFSGELPARVRKRVVSNLDVFRECCPCALLEIGDVKLRLFLGGRQVFDERSRLS  
YTDVLAVRDGKPIASAWRPASRSVISKLGAR

<SEQ ID No.:0876;PRT;Methanopyrus kandleri>

30 VVGTVRELPTLFCESVALEVLSGPKPGLVDPISSSHEDMGPREFLACLPELRRCL  
EALGLIDGEPVDELIRSLPAWNVDVITASGGPNSVRGIVFLGSVYCYSAGLENDPF  
PFGRIRVGRRC TEALWNRSETKCGRIRIKERLAGVFGEVASGMATARGVSLPVL  
ATLRAGRPLEEAVIHSLACMSTLEDAGIPRKLRLNWWKRRASEVLRAGGPFTERGR  
35 AELHKFVHECAERGVS PGASADTVVGLVLLARWGRDIVSPYRDP PRRWSGGAV  
ERN SQASDTVGRNPGGRVGRREV LKG

<SEQ ID No.:0877;PRT;Methanopyrus kandleri>

40 LIRSDGTRAVASAGDEKFLKADEAEVRRELTPFEAYRKICKKLDASVVEPPEDVGHP  
VDPEVGYRVLELLESLWDSGFRRLGLVLTGCGAPLHDIEVGNPVGWTSVRVSNP  
GSDLDLVAPHRDYLLEMSLSGFETVKRFADRVIMSPA AFTGFTVPRVEVRLPRGC

<SEQ ID No.:0878;PRT;Methanopyrus kandleri>

45 MEETGVKDVRDLCEKFLDFKREKERLEELLKEYFKRLEELERKLRAHEEKLRIEARR  
RKTLEKELEMERDEKAELREELRRKEVMIEKLRS DLQRMKKPPLIVGTVEEILDDGR  
VIVKSSTGPKFVSNVSP TVDRNELEPGANVALNQQSMAVVDVLPSEKDSRVLAMEV  
DESPDVS YDDIGGLDEQIREIREVV EKPLKEPELFEKVGVPEPPKGVLLYGPPGTGKT  
LLAKAVANHADATFIRLAAPELVQKFIGEGARLVRELFELAREKAPSIIFIDEIDAIGAR  
RMRDATSGDREVQRTL TQLLAEMDGFDP LDDIKVIAATNRKDILDPALLRPGRFDRH  
50 IKIPLPDEEGRYEIFKIHTRDMNLAEDVDLQKLAKITEGASGADIKAICTEAGMMAIRE  
DRDIVTMDDFLKA VDRVMGKKEEESGEFKRAYH

<SEQ ID No.:0879;PRT;Methanopyrus kandleri>

VGERTVAHYGPYVVKIERTNQDNLDAIRSLLKSAERRGPGNVGEVPLDVFDTRG  
LASDRTRLLVALREDEIVACVAADPRERIGSGPNPHNVFGLVVSPEVRARYQLGHV  
MIAAALKTLREEGLKVARTTPIRRALPFFT GIRADPTHVYRELEVRLRWYRRTGSEE  
5 YLELTRVPREVREELELLRIRTVNARRDPTPFHRLDPEKPVHVFRSGVRSFTLIASLG  
DGDHGRRRQRDIAHVQRAREPSKGDSDRGGSGGRRLDR

<SEQ ID No.:0880;PRT;Methanopyrus kandleri>

MVDVSVILPTYNERENLPRVIPKIEEVVEEEGWTAELVDDNSPDGTAEVARELSR  
10 QYGNIKVIVREEKPGGLGLAYRRGFREARGEVIVCMDADGQHPPECLPNIVNPVLDG  
ECDFGLGSRVVEGSVENFPWYRKLSWGARVVARLFLKLPYRDPTSGFRAISRKI  
LTESRPFVSEGFEIQVETLAKAHMGTQVEYPFLFRPRERGSSNVNIRQILRYLRG  
VWRIRKDLKQRGLL

<SEQ ID No.:0881;PRT;Methanopyrus kandleri>

LRVVVVGGGAAGVVAARTAREHGADVLLISADEHIAYSPCAIPFVISGEIERPEDILM  
RDPTHYERLGLDVRVGVRVEEVDPEEKVVTTEDGDTVEYDSMVLATGGEPLVPPIE  
GSELDGVFTVRRFSDIEPLLRAVQESERAVIVGAGPIGVEMAYALHERGLEVTLVEM  
LDRVLPQFLDDVAAIVQERMEKEGVRVLLGSPVEAIEGDDRVEAVVNGEEIEADL  
20 VVMAAGVRPVTDLFESIGASVLPFGVEVDPALRVKREDGGVFDDIYAAGDCVADW  
CPITGERVPSQLGTAVVRQGKIAGKNAAGGPRATWMGTLNTAVIRVFDLEAAGAGL  
TQTRAEELGLEVVSATVETTTTRARYYPGGEPIAVKLIADADTHRIVGVQSVGGGERVR  
ERV DGV ALAIR LA AKVEDLLSWDYSYSPVARVIEPIYEA AELLREELHS

<SEQ ID No.:0882;PRT;Methanopyrus kandleri>

MKRFLRDLASAATASLTALVLMESFTGITLESCLKHRVWHHPEFLAML PALMDFRGNV  
ALAH SARTATATHLGDEERALQSSLAVLLIGLMVPPVIGSVVYYAYGGDLSTLVGTA  
FLT VLSVTAVVTPVTVGIVRMAAMLGFDPDHVAPPLTTALSDVLTVAFLFTIAEVMVG

<SEQ ID No.:0883;PRT;Methanopyrus kandleri>

LSSVWRGILRILRSMLVISIILAVWSSFTGSL LAKWEAKLEHNPGLAALLPVLMAAAG  
30 AAAASFGRSLSTYLHLGTFTIWA VLRDALVQGSALLVIAGYAGLVTVA FSGRPSLIL  
LAVESTGLTFLT SILVALGSAFTSVRLGMDPDDVVG PVVTTAADS VGII LT LAPG

<SEQ ID No.:0884;PRT;Methanopyrus kandleri>

MEKIEEEVKKRTVVELLTEMKNLAQLSVDLAYSVLLFGSPELAEEVRRRIERRVDELS  
MVLKAKLALAIRDLEDVRHLLPIMELTQSMEVITDAANDIAETVAMGAEPHPIVQKAIA  
ESEEKIRLVRVEEGSELDGKTLGELRLASETGMHVIAIRRGSTWIIGPDKDAKILGGD  
40 VLIVRGRDEGYRKLKKMASGRG

<SEQ ID No.:0885;PRT;Methanopyrus kandleri>

MRWETRREKIVSLLTESREPLTIEEIAMVGEDDKSKIIEDLEHIAKTLRREGKTL LME  
PARCNKCGYVFKSLRVKPPSRCPKCKSEWIQPPRFTIRE

<SEQ ID No.:0886;PRT;Methanopyrus kandleri>

MKLPENVPEPPVCEKFDIGEEARVMRRSHDGYVRLGEVAGLEKFRSVCLVSVRA  
DSGYYYVVPYRVTEERVITEPLRV RKIGEGVVPPIPHRR LGELFVDVRKVGSDYM  
VTLYGKNLHVRTYESLTIMTQRRGSELSAGGMSIDLSSGFLKVEGVRCRPLGFHRP  
50 DAIVGITERLEVVEIRENGSRYLGDVVAVGEFLRITLDDLSLDVPRRVIP

<SEQ ID No.:0887;PRT;Methanopyrus kandleri>

LLKVTVCPPCYGFREVCHKLAQDGEIVDVSDARRLSDITSLCDEGADRVVIAHMDAP  
TVLEWLERRDYALRSIRSKVYNVLSALLNRFKEVHVVVYSQVFLDFVPDSIVREVS  
VELVKVEGSAKDILTWPYPGPCPEALKRGGTLEEMNEHVSELVEETGSTILGEIARR  
DVRVVRTMYLSATEILGRICRNFREFKLGTKMLDALEAAGVLTSRNVGYRMFWSWSP  
5 AAVLGRRSELVNGVLNAVLEMEGAVFG

<SEQ ID No.:0888;PRT;Methanopyrus kandleri>  
MRVALRVAYDGSRYHGFQYQPDVPTIEGALRKALSELGLELVGYASRTDAGAHAR  
YQVVVVEGDPELAQPDPIARLPKDIRVIAKTEVHEEFDPRRDALRKEYRYFLGPLN  
10 RPEAAARAARKLEGKHDFSAFRREDGRNPIITVERCELVEITPNAYVLRVVAPRFLW  
EMVRRAGFWWEVGHGLREEGDAAELLSGKFEPSSKKPRCLPAEGLILWHIEYDEVR  
FERTKAWFEDHKVIQLGGRLRLRLEGAESC

<SEQ ID No.:0889;PRT;Methanopyrus kandleri>  
15 VSLEKVDLERLLEHIEETNFCRRLFREVSEEWKTIIGPLQGDDATVIEVNGERLVINM  
EGPYPAKIGRKTAIIHSAADVVTGGEPVAFDAVQAESEEQAEIELEDLRKQAEGLG  
IKILGGNTQSHPDLPVSVVIGRLIADEPIPDGTAREGDALVFLGEPVRGDVGDV  
YKAKVKFNAFLRFLREGIDVSAAKDASRGGVLGNLLEMMGKAKKGVELRSMPT  
WTGYLGIFMVCMDPNDVERAAEIAFEEGCPFTVAGEVVDEPVIRFGNRELVSEEM  
20 IEVYRRLPYKPPGAGR

<SEQ ID No.:0890;PRT;Methanopyrus kandleri>  
VGRTCSGGAFLGIFSGMLSGYIPGLHPNTFFSEFDPTYLDREDVLTFAACSAVNVP  
LSKVESMFLGVPDDQASVAVLIPLQRYTIEGRAEEAARLVALGTLSTGFFAAVALPYI  
25 VKIVGPMYVASKPIIPWLVLTLALQTYDNGLRGLAVFSASSAVGYVVLSGPLDVASP  
LEAMLSGFYAIGPGLSCLMNRTSIPKQRP GKPAISGKELPKCGILAAAGCALGFLPG  
LGPANVSVLTRLGVDTTERYLLVTSGIDAADAVSSIVALHALGNPRSGASVFIQSV  
GDITYPEVLASVGVYLLVSVLGAWLLIFSTRVLGGVLSGARARVLTGTVVLGLLALMT  
FHGLGSLGTAIACAGIGIYALRSGVDPSLCTSAALPTALKLLGVG  
30

<SEQ ID No.:0891;PRT;Methanopyrus kandleri>  
MLKELWRSFAMALGAAWTLGLLALTVHILGLVWTIVLLLGISVLLGISVSRRVSPFIAV  
ARGLGLLSLLMVNAARLEYLAPWLAMPVLGALYVFDPRPAFYLVIAAAGAVLLLRALIE  
IHEAAVEADFRYRSKVQGLALAVREIWSGIMEALERLSTISAEEKKEELSGTFTVAGKK  
35 LLRWMLS

<SEQ ID No.:0892;PRT;Methanopyrus kandleri>  
MIGIVLAAGEGTRMRPLTKTRPKVLLPVADRRLLIDFSIEAMKRIGVEHLVWVEYLAE  
KVERYVKDRWGDSFELEFVRQKGKPLGTAHAVYVAWREIEPDETIVITNGDLVFDSE  
40 LLERAVREHEGVASMLVEVEDPSEFGVARLQDGYVVELVEKPKPEEAPSNLANA  
GVYVAEPEFERFLERVKPSRGEFEITDALLDAAIDEGVLGISYDGFWSVGRPWD  
LLDANAWALRNAMSREVEGVIEENVELRGPVWVAEDAILRSGAVVEGPAYIGPGC  
EIGPNCYIRPATTIVRDVRIQQAIVEIKNSIIMEGTNVSHLSYVGDSVIGAKCNLGAGTII  
ANLRHDERNVKVVVKGLEDTGRRKFGAVLGDGVKTGINTSILPGRKLGYPYSATAP  
45 STVVRKNVPEGKMLVQGDQILVDWEGRG

<SEQ ID No.:0893;PRT;Methanopyrus kandleri>  
VGKYFGTSGIRGRVGEFLTPELALRAGRALGEYLGGGTAVVGRDTRVHCDALRAA  
VISGLTAQGCDDVIGVVCTPTLGCYVATEGLDAGVMITASHNPPEYNGIKFWDS  
50 GMAFSPEQEREIEQIMDGDLEYPNWDEYGEVVDDETALNVHVERILDEVSDGDGL  
RIVVDCANGPSAFVTPVVLREMGCEVISLNAHPDGHFPGREPEPKPENLKDLMRTV  
RATDADLGIAHDGDADRVVFTVEEGKFAGYDEVLLVLCRRILEEKGPVKVAVNVDA

SMVIDEVVREMGGEEVVRTKVGDVHVA AAIREEGCVFGGEPNGTWIHPDVHMC PDG  
PLSAAWMVSLLEEGRPLSELLAEIPSYPVVRETVECPDELKPEVMRLVETRLREAY  
DDIDTVDGVRVELDDGWVLRPSGTEPLIRITVEAESEERARELRDEFVDIVRRCVE  
EVRE

5

<SEQ ID No.:0894;PRT;Methanopyrus kandleri>  
LFAFLAGDNVELALMELKGALRAEVGEIEVEVHDRVAVVEGLTDEEAERVVRLAR  
THAVYRVGEGRRVRVEIGGERRPVRLLAEREKLSDRKPHKRPEFMPDSTEPFLARVL  
VNLA EARRGERLLDPMC NVGGILIEAGLIGCPVGVVEVREELVERTERNLRHYRIEE  
10 YELHTGRAEEVDEILD EFPVQAAAVDP PYGRSSYIEGGPVERLLLNTLDALSEVVEGK  
VSLTAPVDAWEEVKESVKRVEGEVRDRVHGS LTRVIAVVP

10

<SEQ ID No.:0895;PRT;Methanopyrus kandleri>  
VKVLLVQPPFEDDIARVLGVRGFI GLVYLA AKLEKEGFSVDILDCPAEGVEMEDLR  
15 GRIRGYDAVGITATTPVAPSAYKVAKLAKDEGAFVFLGGPHPTFMDREALRESPAD  
VVIRGEGESTTVEVLEAVDRWEESDLSNIPGITYREGSKIVRNPDREQEPEDLDSLPL  
PAYDKVDLDQYSADSVRFVPVITSRGCPFRCLFCASSRIFGPKWRGKSPDRVVEEI  
SYLVEELGVERLEFVDDVFTA HKRRVREICEKMREEGIDVPWDCGARADTLTPELA  
RTIREHGCRTVYVGAESASNETLKRINKGITVQDVIACRKVAKRHGLRILLSFILGFP  
20 WEDREDVFRTIKFARRLEPDYVQFTVCTPYPGTPLYDLAKERGLIEVHDWSKYTTV  
DPVMRTEHLSTRELGRLLQRAYLSFYLNPRYLLNALREGKFLFKRIVKSGIRAVLSY  
LSR

20

<SEQ ID No.:0896;PRT;Methanopyrus kandleri>  
25 MTRVGEFIRVLNRVLDSELARRLMKLGAKRCESCGDVRVKVALDVAYGGREDACW  
KCKATARLVKKLVEKTARAAGVDEETVREALSDSYRRGIAVTLLGIYRYGVRKPFV  
PAAPYLVVWDVTGLCNLRCEHCYSEAGKPAPGELDTERALEVIERFSEWNVPGLAF  
SGGEPLMRDDFFELAEASANE G MFTALATNGTLIDRDTAERLEAAGVEYVEISLDGA  
RPETHDKFRGVKGAWERTVEGVRHCAETDMITVIAFTVHRNNVDEL PQMLDLAEEL  
30 GADGIAVFNFIPTGQGRFCPELDPPEVREEVLKMLVREALDRDLMIYSTAPQMSR  
VSLQMTESGEGGVLYGTHFAYAGEGRWIEPLVEFIGGCGAGRCLLAIRPNGDVQP  
CVFLPVKIGNILED DPEELWEHEVLWACRNRDELEKPCGECKYRYVCGGCRARAY  
AITGKVEGPDPGCVLVGDANK

30

<SEQ ID No.:0897;PRT;Methanopyrus kandleri>  
35 MRDSPDEVSVDELVNMAVAGGIDE GTALDQGLDPYKVMRAAHEARLKIVGEH  
VTFV VNRNINFTNVCINRCRFCAFRRDPDDPDAYRMTPEEVGERAAEARDAGATEV  
CLQGGLHPEATFEYYLEMLDEIKSQAPDIHVHGYS PMEVKYCAKLAGEDIEDVLREL  
KRAGLDSMPGTAAEIFSPEVRKRLCPDKLEADEWEHIIIRIAHELGIPTTCTMMYGHID  
40 SPRDWIDHMKRLRGIQEDTGGFTEFVPLSFVHSNAPIYRRGGARPGVSGMTDVLV  
HAVARLYFGPLIPNIQASWVKLGVKLAQMTLHAGANDLG GTLMEENISREAGATEG  
EQLEPEEIVEIIREAGFTP VQRTTLYEPVKVY

40

<SEQ ID No.:0898;PRT;Methanopyrus kandleri>  
45 LITSVPTRSGLNPA GDRSDRGGRLKGNDLLELMDRANRLTREKFGTVVSYSKNV FV  
PLTRLCRNRCAYCTFRREPEEEVRS PYLSPEEVFEIVEKGKEAGCKEVLFTFGERPE  
ERYDEALEWLEE HGYSS TVEYLVDLCRCVVEYDMLPHSNPGVITKREMRKLRRW  
NASMGLMMEILSERLCEESGPHEHSPGKRPEERLKVLYAGELKVPFTTGILIGIGE  
TWEERVKTLEEIQRMHERYGHVQEVIVQNFR TKPGIPMEDHPEPTPADLLRTVATA  
50 RLILPDVPVQVPPNLNRETGQLALLAGANDWGGVSPVTKDYVNPEAPWPEIEELKR  
LTEDVGFRRLRERLPIYPEYVRRGWYHANISEVVERLS DDEGFAR

50



<SEQ ID No.:0899;PRT;Methanopyrus kandleri>

VGAGEMAEALGEELEIREIQRRWEEMDLLSKVLEKNRDGPLFYFLDGPPYASGSIHL  
GTAWNKIIKDAVNRYKLMRGYRVRLQPGWDCHGLPIEVKVEQEVLSDEIECKKDIEE  
KVGVDKFVEKCKEFALKHVEIMTEQFKRLGVLMDWDNPNYMTLDNEYIEGAWYTLKR  
5 AHERGLLDRDVRIVNWCPRCETALADHEVEYKEVEDPSIFVIFPIEDDSDAEVDLPE  
NSALLIWTTTPWTL PANLAVAVHPPEEYVLARAEVDGEEWHLVADKLKVLSVVT  
SYEIVDSFPGEALEGLRYPPLWEEVPKLRLEHEEDDRVHRVYTAEWVTMEEGTG  
CVHSAPGHGEEDFELGREVGLPPHCPVAEDGTFTEDGGKYEGLYVRDANEKIVED  
LREKGLLAHEDTVEHRYGHCWRCKTPIIRATEQWFLKVTEVKDEM LEWIERVEWI  
10 PEWAGHSRFSKSWVENARDWCISRQRYWGIPLPVWECEECGHLEVIGSLSELEAKA  
VSLPPGEPDLHRPWVDEVVLKCEPCGSYMRRVPDVLVDVWVDSGVAAWASLGYP  
REDEFERWFLKEGRCDPDDPEAGADFITEGHDQTRGWFYSQLGCGVTFDTCPY  
RTVLMHGFTLDEEGRKMSKSLGNVDPMDVVEKYGADTLRWYVLR SNAPWRDMH  
FSWQDVRDTHRANVLWNAYRFTKMYSELDEFDPEEHPLEDLEEHLKPEDRWLLS  
15 RINSLVEEVTDAFERYHVHEAARALYRFVTEDLRWYIRLVRERWVLEGDDPEKLA  
VYAVLHYTFDRLVRLAPIVPHVAERIYLDYVRAGDDPESVHLTDWPEVDDRWWDE  
GLEKAMELVRKAAEAALSVRQRAGVKTRWPLRRLFVEVEDPKRLEDLKDVLARVA  
NVKEVELGEEFPEKVPVAEPRPDKIGPEFRSLAGRVIEHVKDRAEEVAR SILKDGEY  
RTELDGEDVVLTEEHVKVTEDLPEGWEAEFEFGGRVYVFVELDEELKSEAWAREV  
20 VRRVQEMRKELDLNLEERIRVWIETDEEIAEAVEEHSEYVRGETRADELHVNEGWP  
EEVDLEREWEVEDRTIRIAVVVSG

<SEQ ID No.:0900;PRT;Methanopyrus kandleri>

VKWMKVDPSEFELEFFEEIGFERKRCPECGEYFWGPPEAEVCNETPCVEYSFIGDP  
25 PASVKLDVWEAGEEFFRFFERHDHEVLDRYPVVARWRDDIHLTIASIACFQPWVTS  
GEVPPPANPLVINQPCIRLNDIDNVGRTGRHFTLFHMGGHAFNNHPHDDRDIYWK  
EETVRLCYEFTVEKLGIPPEEKIAFKESWWEGGNAGPCFEVVDGLELATLVFMQY  
EQVGGEYREL PQKIVDTGYGIERYAWITTGEPTAYDAVFGDLV DATARDLGVEIDGE  
AREILGELARVAGLMDVETESDLRVLNRVARRLDLVDNELVRVAEPVEFVYGILDH  
30 ARCLAFMLGDGVPSNAGEGYLARLVIRRALRLLDGLDAEREYLLEVVERVLEDLR  
GTYPELAEREEYIQDALECEIDRYTRALKRGKKEVRKRLEEKGELS FEDLVELYDSH  
GIPPEVAREIAEDEGVEVEVPDDFYSRVAERHEGPEEVEEGLEELERIAVEEELPET  
ELAFYDDEKRLEFKAEVIGTYEVNGDAWVVLDRTYFYPEGGGQEADRGTMRWKD  
GEAEVKDVQKVRGVVFHRIDGDVPPEGAEVECEVDGERRMRLTRNHTATHVILEA  
35 ARRVLGDHVWQAGAHKSTDEARLDVTHHRRISDEELREIERLANEIVMKDLPVNKR  
FMDRNEAERRYGFELYQGGVVPGREIRVVEIEGWNVQACAGTHCDSTGEIGPIKIV  
GRERIQDGVIRIRFAAGEAALERIWETEDLLRETCEVLRVNPENLPKTVKRFFEEWK  
EQRKRIERLERELVEAKLRAAPAEGRRVGDFTVTLVELEDVEVGSVAGTVEELVKE  
HENLVLVAKIVSNGSCQVVVSGESAPPAGELMREIGKLIEGGGGGDERLAQGGG  
40 RNPDGLTEDRLVEIVEDLAGG

<SEQ ID No.:0901;PRT;Methanopyrus kandleri>

LTGIPEEVLEEPLRVARNANMLPTPEVISKIFQDRWQKRHFLKHVLDGKTARAHLEG  
YIHHDLDYALTRSNCQHQDCRWVLKYGLYARNPIGR LTCVSKPAKHAEVAVLHILK  
45 WLMTSQNFFAGGQGGQDFVNFLVAPYIAEEGLSYEEIRQLAQIMMFEATQDLVARGG  
QPAFTNVNLELTCPDFLEDEPAVGPGGEIVGTYGDFEEEAIMFARALLDVQLEGDAA  
GAPLKFPQIIVKVRPGYDKETLELAFEVAAENGAVYFANMLNRDWRKLVGDNVNYM  
GCRTCLATNWTGDWEIDTIRTGNFEYVTLNLP LLAHESRDEDEFLEKIREYCEVARE  
ALLARWRCVKKCLEAGLYDGCQRWKPDGEYYFRYEHTTWSLGFVGLAEAEVLTG  
50 YGFWEDPSAMRLAERVLEELNDVREEFHERDGRRW SVVQSPAESAERLARKYL  
EKYPDAKVRGTEHRPYLTNSCHVPYDEDVNVVERAEIEAKFHPMTLGGHITHFWLG

ERTDPRSLMKLTVRVLRNRTIGFLAITRDYSVCDRCQRTYEGVVEQCPECGRRCTI  
WSRV TGYLAPVDSFVDGKKQEHKERLRHEL

<SEQ ID No.:0902;PRT;Methanopyrus kandleri>

5 MEPGFELKDV FRES PRKRGLRPG RHAFRATFR RDPVYLEYRARCEDPVGDVSELL  
AERYNTPGDL LDRLQMSSLDLVV PARPYVVRGGRPF AEPEHCDVGFATRGRVLLA  
LVRVME AQRGSE DVVHAAATFACAPLLQCTGYRGDEWDCVDELAPVLDAPDSRE  
LSHRERSIIEFADRASLGEKFVRTRAPSV DLYLVEAVGEVEPVAAEFTDYAELSLYRS  
10 DSCFLG LLVETPEGVLPADPEELLKAPEDWDVRVAVRGPINPAENPDPLDRHEMV  
RLGEERGNL KQPEADVWAGVYRWEGWWKGRFRPLRSVPMSIARLVWFARRLD  
LGMVPETLPEEFDVDVEAPTWEVWIEGDSTDAFEAGCAVAIATGLIMSLNVPVSS  
EPTSVLHTAEDLEEII GVRPLREALRKLESGV SIGSTEPVRGVRVKSDDVLTLSWE  
DAAHL PWWVTSLSKIGEDVAEKLVERPELIRDPEFVREYVRTALASERHAFKIFREL  
VEERSPDFASSLLRFAASDP EMSFEVLDWLRDILEGP

15 <SEQ ID No.:0903;PRT;Methanopyrus kandleri>

LTEKVRRI VRIKATGDVVRALSRVVEEGLELSILNASVSPDAVAAEIAVQAVDDEHVR  
NFLRTLREFGIEVEEIEKTLVRDEDRCLHCTACHSV CPTGAIELKGVEVELDDEECIV  
CGSCTEICPV GALRIASKEGERG

20 <SEQ ID No.:0904;PRT;Methanopyrus kandleri>

MKFWIPH PGHTSGLEALLSGIDDLGRVEAVYTGGSPDEVGTGRPNLHYPRLDEVRE  
QVELAHSHD VLYDVVINSTCPLRGEPTRRVAERYSNYLEELEKAGVDGVVADPFV  
LKLA AEVFD RITVSC LAFVNTPEKAEFYADVATAITVDTSFNRRFEVLEELSRLQVEL  
25 KVIVNEGCLLD CPYRPFHFNIFSHLYGPDEVSVYDDYYRRCIADRLEHPELIISKSPWI  
RPEDLGHYLEYVDAFKISGRSHQVEWIVEV VNAVYLEGRWDGNLLHILDCPRELRDV  
FYVPNP ELDGAIERWKECDFRCHECGFCRELADR VVEVREFKSTVVGEVSA

<SEQ ID No.:0905;PRT;Methanopyrus kandleri>

30 LSKKLLRRCAAQLKRVQDALGDDAVVSEVDLFVARCGCVGVVFMVRGVELRDISDE  
VLDGLEEAGKALGVRPDV VYARVVPGTQVVIDLAVRTLCDTCRREFSGEEPRPDLK  
VLRGATER

<SEQ ID No.:0906;PRT;Methanopyrus kandleri>

35 LTRRWYLCCSRHHLDTVPEDSDGIVVPVTEHGVATLLPRYPETYEVEDIVDVAKDR  
GLSVQALMDFTCAGCEHLSPDGYP SLRSTLDY LASDLEVDGVVADPYLVEVLATE  
YDLTVVVSHTAAVDTP EKAWHFERLGADVITVDPALNSNEEEVSAIRERSVELRTA  
VGAITFRDPVAFFERNLFSHATAEGIEVDPYRN NPYEPMRERVVWEVREELFDEV  
FILASGEPP

40 <SEQ ID No.:0907;PRT;Methanopyrus kandleri>

LPGRKSID EINNRIERGEVCVVTAEEMVEIVEDIGPERAAKEVDVVT CATFGPMCSS  
GVFLNFGHSDPPIKMRRVWLNEVEAYTGIAAVDAYLGATQPSEDRGIEYGAHVIH  
ELASGEEVVLRAEGSVTDCYPRESVETLITIDDINQAVIVNPRNSYQRYVAATNSSEE  
45 TLYTYMGKLLPEYGNVTYCGAGQLNPLANDPEFRTIGIGTRIWLASHGYIIGEGTQ  
HDPSSGMATLMVRGDLKEADPEYLRPVVLEKYGVSLAVGIGVPIPVLDERVAASTG  
VSDADIEVPIDYGIPSRDRPVVKRVTYEELRSGKVEIEGRTVRTGALSSYKMALEIA  
ERLKEEIEEGEFTLTQPV EPLPREREF RMPYRPPSLPRVRDIMTESVVTASPDESI  
EDVARRLIEKEINHIPVVD EEGRIVGIVTSWDIAAAVAEGKRRLKDIMTEDVITIRPHES  
50 VDEALRRMDRHNISCLPVVDGENRVVGIVTRTDITEVLRRRG

<SEQ ID No.:0908;PRT;Methanopyrus kandleri>

VECLVMYGEIAVKSPPVRRRMERLLARNLEEQSGGRVKRLEGRLLVADPEVPEAIG  
KTFGVERWTRTLRVDSHDPEDVFTEMKDVNLNDLKARSFAVRARRATHDAPSSREM  
NVELGDLIRRYTGWTVNLDEPEVEIHVELRPEGTFVYLD SWMKDGP GGLPYGSQS  
RVVCLVSGGIDSPVAAWYAARRGCEVIWLHLDRGKYGSEVDAVERLAGKFSEWLP  
5 SDVELLIEDFEDFMESLEGLEGESARYRCVLCKREMIRRACDVCENVGAVAVVMGD  
VIGQVASQIPDNLAVIDRVARFPVFRPLLGFDKNEVQRLSERLGLFEVSKEHRPCPL  
APRNPVKSADPGKVLKLEELGVLHRGLRGSGVAGSEEYR

<SEQ ID No.:0909;PRT;Methanopyrus kandleri>

10 LCDARRGCSTLGLLDSLLGGGDEGSGEAEVREVRDEVIEVELIRGPVYFKNDSIIAA  
RGDLEFLATKPVRSSGGITGLLEKVLKAKLLGLRRYFVKVDGSGVLYAGDGGKVKV  
LEVPEGETVTVNQDRLLFTTTPADVAAQLDASVLSTGLIDMGFEGPCKIIVTAECDP  
VTVEVDGGPVYVDPECLIAWTGDLTF SATWKGS AFD FLLGREHGEEFLLEAHGYGK  
15 VLVAPYDERIRRLERMIRRAGARGGGVVGGENYGEEYGEEYEEYEESSDEGGLF  
DDLDFDFDFTDDFDLDFD

<SEQ ID No.:0910;PRT;Methanopyrus kandleri>

MDLAVQAHKVYLLGTRGLARGDWD PYSYTG RPPMIDYPVLPFLPAVL FHRWLADP  
YLA CT LIDGVYRSLPCWIWSILKFKGMSTPRADAAMMVYAASVPFQIVEVFSTRVVT  
20 TFSLG TAGAALILRRCRGSVLRGLPVLWLWMLSLLGNPLYVLPALLLESMEERRLLL  
ALLPAVPTAVLSTYFLTSAFTWVPPAWTRASPWEHWVAPGLGMLWAVFAASRGG  
GSVLPVLPWPILWSTEAIWGPVWPLSQLDPWRVLLTAILSSMIVVERYERLRIAYLG  
SGLSAVGFPILALMVSFQPMHWESAGTASWRVLVAGDNGFEALSPEFSGKPVYSIA  
GAFYQGASEPQLQSLTPVLVLVNDPSVCSYLYASRWEFSKAVEVTRKELDPYLRAL  
25 PIGYVDVRGTAVRRSTGRDRVSWCGRPVLTLD DAVPVKRFKVLYVGSFSLYGILWA  
KLAGALGRPPIVPGVYPRTVMMSGQELDPNELPWTGDVLVVDKMGWREAVKLGLVK  
RARVVMRVSGGLLPWSWGADVDEVSARLVKYVDVNGPRDDALRIDSDEIEV RTP  
GRAEFVLIPWGWAPFWAVNGREGQVCPVGPYMLVKTGDKPAIVRYVGWERHQSR  
AYLAGCILAVLVSVVWAAGRKPL  
30

<SEQ ID No.:0911;PRT;Methanopyrus kandleri>

VPETPNKVLII GSGPIIVGQAAEFDYSGSQACKALREEGV E VLVNSNPATIMTDPNM  
ADRVYLEPLDARIVAKIIIEERPDGILPTLGGQTGLNIAVELDEMGVLEEYDVEVLGT  
SVETIVRAEDRDEFRAFMMKKIGEPVCASEAVSSVEEAKEVAEEIGYPVVVRPAYTLG  
35 GTGGGIAEDEEELKRIVERGLEYSRVNQVLIEEYVGGWAEIEYEVMRDGSNCITV  
CSMENVDPMGVHTGESIVVAPAQTLTEEEHQMLRSAALHIIDALGVEGGCNIQFALH  
RETGEYRVIEVNPRVSRSSALASKATGYPIARIAAKIAIGLRLDEIENQVTGETYAAFE  
PALDYVVVKIPRWPFDFKFPEANRTLGT EMKSVGEVMAIGRTFEEALQKAIRSLEIGE  
PGLGPSPEELEADPEEIRRKIETPNDRRIFCIYAALKRGLMSVEEISELSGIDPWFVEK  
40 VKRIVEMEHEIVRRKDELLEFIRTGEADEETVEFVREVKRTGFSDEQIAELLGVDEDE  
IREARLGVGVEATYKLVDTCAA EFAAVSPYFYSTYEEEC EALRYD

<SEQ ID No.:0912;PRT;Methanopyrus kandleri>

LSSDPRRPTKV PWVKAMVIGLIAVMSAKALFHEWVVATLHPTNKDRLVMKVERVPC  
45 RTGDDL RP GNV EYAKVYGCTKYATLGYGSQDPRRILVPALPPRLMSLTVTVAGNV  
IRVFRTCFPAPFIIVTATKLPRISVNQYEIRIHSPCKILLQPTVTGLLKYFPPVFITDGKS  
TRNPTHLCRNVAIIMPYALTVMGGLT PIDVSVSVSGERLVVNASSVYAPKGVTIK  
WEPICPLIWTTYADIVWRWPYWPYSL

50 <SEQ ID No.:0913;PRT;Methanopyrus kandleri>

VGAYLSSHLDHLRGHSLEMAVLAILTVTALVIIPEDVPTIPYVSLISISSIKAHDSLRS  
GELPQWNPYLGGGFPLAPTPYYLLHALGRTGLIIAILLSVLVLLLASNVNNMLRVVIT

LPAVLLSLIPSPPLPLILASYALGFIGNNPLLRTVGSIGIPDVALSIELGIRNPSLPVLLAS  
SACLVDCLVATFGAVPLLTSRPGPIPLLLILLITVVAILPALMALAMLGRIYDPYRWKFS  
GITAILFGVQTYLHELPTALATPIILFSLVLKNFNTHLDRRISVRLNVRVSKPLRFLTAL  
MLVLFIVICSVLATPRFAVVGKVVGSRTGMEYIISDPWFSECVKRVLSGHPIWNT  
5 PLPTDPHMGPASLLGYELGDPRAVPPPLYPTKQLEVQPRVVAPLISSPSSWAETSLH  
ALQLAEAVASRGASVGEPRLNTPTEIRGYGLVGQVYDLWWKGGTHRGLLLQVNGR  
AVYERPSAWPSVVLTLMSIAVAAIETAKRKSDTV

<SEQ ID No.:0914;PRT;Methanopyrus kandleri>

10 MEIRITTILAIVMIIILNFIVEYEAPDLGKHIIYDLAIQSLKSYLIEKYGLSGSDWDPYSYL  
GRPPLANYPILPFMVPVVIHKFLVKDIFLATCIGEELLRLAPIIAWIIQLNLNSAEATIA  
LLAYLALYPIAILYEVKYIRIATTMSYSLAAIAVIIWNSKLKDKPIKRMFSFVLWTASLYSN  
FIYSIPPLIVAGILDSPIFFLPIIVTFPVLLFASSVGKLEFDNLPESTTMGFSIFDVYDTILA  
TIVVTSMTFLSLLLLNISHKKKFVIGTIGLIPLFGLAVFLSPKIHIIISISKILTQLDMYRM  
15 PLIACTLIIVITPKIFSKIKLSLTTYSAIFALVSVGIILKVISPTPMIPIVVEYEFSSPAIVSHD  
YRASNAHLGLFSLACPLSTLSEPTYILGGAFYQGCSEVSSRILSSILFLNSGGRECC  
EQLAHPGQRHLFDEDIARKVLTLLPLTSDYGDADIKTIRSYSDIVGFTFSQKPTLSLW  
DIIPMTSVKVIYIGSYTDYSFLWLNLVRSAPTGHFPMIPLIRPYNVERGQSLSAEQIPW  
SGDILIVDSEALSYPETEKLAKAKEVIVVYSSRAFDAEPPSKVVRRLRRITHHVHL  
20 GPVHHPLHSPIVKLVKESCVKLSPIHDALHRVSNDRYVLDSRGHRFVVVPWAWAP  
FWAVDGGREGQTCPIGPYMLVKTDGKHTTLHYVAWERHQSRAITVSLFLLAVSIAAT  
AILISVRTTEGQAEGRS

<SEQ ID No.:0915;PRT;Methanopyrus kandleri>

25 VIATLALVNAYAASIPRYQIVKGKVTYPYFDEHDLLKTLQYPSVLGPAINTYLPTRTVV  
NCRQIMLYGLKRVGVISIGAPVTMLPTLNVDNLTKSSDNPIVITYYGISSNPICLSFPCI  
DVVKIEKDLLLIPTRNSLVAKGRGEVIKIEVVLIQGNWNIICMLPENAYSGVFTWKS  
ELQPFWLL

<SEQ ID No.:0916;PRT;Methanopyrus kandleri>

30 MLSPETVVTINTIITSLPFLAAIYVIAKRPARALIQLYSLGYLTPVAVLVYGLAIPVPGNL  
YAYFTGAPIFLAYGVTDALIVLYALGSALAVIFVGIDQWADVAYSASTTVAWLLRTLID  
PMSPRLAVLSGALITATINALVAWYKYQAWPIVPLPSVALQFSVAVASAVTLEVTAW  
WVLNKLKPSPQG

<SEQ ID No.:0917;PRT;Methanopyrus kandleri>

35 LNVDVAVLAGGFGTRLRPLTWDTPKPLVPILGKPLIEWVIRSLPRDWHVHIAAGFSS  
EKLERYVESDPLPRKLHLKVEPKPLDTAGAIKFACRDSTADAFVAFNGDIVSSLDVR  
QMLKFHREHDGIATIALYPPEDEVSRFGVVDLDDDDRILDFVEKPEPEEAPSNLINA  
40 GAYVLDREVLDYIPEGRPVSIEREIFPKLAEGLLYGFKFEGYWVDVGLPETYLEAH  
RVLMEHECSGKSVVGARITDLDLKPVPVAAPMTELRSSIEGPYVYVGERTEINGSVI  
ENSVILDDVEIIDSEVRNTIVAEGCKIENARLDGCVLGHDAEVCNKGVRVAPGK  
EAERDLEDEWVI

<SEQ ID No.:0918;PRT;Methanopyrus kandleri>

45 MRDDVERTPDDLRAVLTGFEDELPRLSYQFILTSGSGSSHVAHYASLLFTHELNI  
ATVSHPGRLAAWADGADLAIVVSMGSKDSHSIARALGCEILAVTCEENSPLADLAD  
YLLLLPVEREEGFLNTRTIVSAMFALCAYASELSGEDLVDPDVPDRVERRLERGVPE  
DVILEMRDREKVVFFIGDKYLYVAAEQALKSIEVGDVNAFATTSDELHFHGRFFGDHS  
50 ERLYLCLNEKGADLIEERSGGEATVVRPEDLGLDVPDPEDPNAPVETLPVLYLLVDEA  
YGPVDTTEARSWWNHV

<SEQ ID No.:0919;PRT;Methanopyrus kandleri>

LKILFRILERTPGVDGPERFLKFSLVGLSGVFVNGLLLWFLTEVVGIYYVVSNIIAVEV  
SIISNFILNDLWTRDRRDPGLLNFLKRLAAFNICAGGLVINTAVLWTLTELLHIYYIA  
SALFGIAAATLWNYWMNNRVTWGVLLERAHEG

5

<SEQ ID No.:0920;PRT;Methanopyrus kandleri>

MGKLFGTGVRGVVGEDLTEDVARRLGLAFGTYLGGDAEVLVGGDTRTSTDTLKD  
ALISGLTAAGCDVVDVGIAPTPAVQYLVDAGFDAGAVVTASHNPPEFNIGIKLLGSD  
GCGLSREDEQEIERIYFEENPDRAWDVRGNRV SAPDLLNFEEAVLDYVGDFDGE  
10 GLRVVDAANGAASSVTPRLLSELGVEVISVNAHPDGRFPGREPEPSEENLETTMN  
MVRAAGADFGLAHDGDADRLILITGDGEFVPGDYSLAIVA AWALDEGKGSQV VTPV  
SSSMCVQKVVEDRGGEVIWTKVGEPVVVEELKRAEDPALGGEENGIIYPDFHLRS  
NGIITALLICKLVAEVGSLDDLLAEVPKYHLHKTGVECPDDLKPKVMERVESLVEEEE  
LEDVLTIDGVKLFYEDGWVLVRPSGTEPLIRVFGEARDRETAIRRVEHWKERVEEIV  
15 SELKG

<SEQ ID No.:0921;PRT;Methanopyrus kandleri>

MERLEWRESSPAEFFERNREMLGFDGPIKSMVMTVHELVTNSMDACHLNRI RPDV  
RVVIRREEENVYRVRVIDNGPGIPPERVPKVFGKFLAGDKFDPVYGIQSMGQQGIG  
20 AAGVALYALITTGEPVRVLTSTDGRTAHYFEVKPDPSTNEPVVVRREKR PASRRGT  
TVEVTIGDAVYESGRRGPREYLRRLHAVNPHARISLRDPDGN AHVWEPLVEELPDP  
PRVLKPHPHALDAHKLLRIAERTSRRTVRTMLVGELCRFSEARVEELRERLAGRVDL  
EKDPKELTREEAELIVKALHEMDFMRPPSDVSPVGESALKAALKSEGARLVS AVS  
RRPLVLRDNVIQVEVAVGYGEEGDLWRFANRAPLMFRAGGCSITKGVEEVDFGRY  
25 GLEEDRLLILVNVNSPFVPFSGPAKQEIGSEYVEEEVKRAVQRACREL GREVRRRR  
RARLERQKMKRIDRNLRIVRKKAEILS

<SEQ ID No.:0922;PRT;Methanopyrus kandleri>

LPVHAVVGFGYPKYDPVSWFAERSLIETLEVKTAESRCLELREGSTLRLEARRLGR  
30 REMSATALLERVEEPGEVHVFASSSLKGQTV DGD TVEDRMGEYLVDPLNDVGFEV  
EVHWSSAFDPLSLLPELIDTLTRLDDRVLDLTHGVRIQPAISAVAGMAAARLP GSD  
MELVPVYGAAGVEVREVLRWSDGADGSRGIILDIRRHLESAMAFNKVVDYTL DPSR  
EHLEELCELTESALRELDVPDDRLEVRRELVIDEGALRGLADALRSNYPRKVVKEAR  
KWEPKSPEDVLDRLHISSGRERAKEYLRALSNFLARALNPFLQGLDLPKSPWKAA  
35 VQLAEWLCDRGYYAASVLLLREL VYLRTVYEWAEHGHGELKEVVEEYLRALIDPD  
ARKPRGVYDEL CSTIEEVT DGEAGDPDDLVRKIEREILNR

<SEQ ID No.:0923;PRT;Methanopyrus kandleri>

VIGLFRGKRREIDYSIDRRELIEVVCEIRDVRNSFAHVREDVGRPDEKAQNLVKKVKE  
40 IIG

<SEQ ID No.:0924;PRT;Methanopyrus kandleri>

LGTAGRFGGWWRSRIRPPKRPRRTGEVRRLSWVLEMIRTLLCMYVGVLIASYLGSS  
EACTRSLRLRVLPVVGSGLYGHAASLSALSSSVALYAAQDKVNSTREAVGLLLLLAF  
45 PTSVATVLQFYLPVVVPAVGPA GLLMIGISVVGALLTSAFGRVLLPGREDGDGPSKIT  
LVRNPWRTAHSVFLRVGPAVALAMVAVKLGE GYGVTEWVERFLHPLTRSVGLPSD  
ASLVVFGCLINAVGAALGADLWASGKL RMEDLALALAFGRALSLPRINLQFLFPPA  
VTFLGKKGLLGATVRTLVETLANISVVLALTA FVH

<SEQ ID No.:0925;PRT;Methanopyrus kandleri>

VRWTPALTAIVTLLAPVSSTMVNVAMWAGDGAASNCESSLRAIEYWNANYAGTY  
HINVITYASPSDWRTVLETGRDPYTGTHIDVIYVPGGYHPEWHWDPDWIDLLYHAQI

DLGIGYVGICAGAYLHAGVTHRGAIGEDLVVDGVT AIDGNRGN GYVSVLIQQNPITP  
QSTWGKVY EYYYANGPGMAAEDGSVFISDNRWYKVCWLDGKEVRINVQGF GK YV  
ELVSGWAMVLGWYNVKKGDKWEPRGRFVLLGVHPELTERTGAWKLLARALI WAA  
GYEPKETPTKKQGPSEQTPLVPVPPICSPRSRRACGRSPRATPSCQGT

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<SEQ ID No.:0926;PRT;Methanopyrus kandleri>

VSLRSKLADLAGLLALKAVRFGPGMGRSFGWTVIKVGGF DAVRELARRPEYGVVL  
ITGTNGKTTTTRLACALLAEDA EVSCNYDSNTINAVTTGLLKGRKAELVVTEY GIRSR  
EYGIPDTVCELVDPLAIAYTTISKEHFRENADKKDPFGAYFEAKRLLARPLKDGVLVL  
10 NADDPRTYIRDEKRGDPVEYV FYGLEVEIEDLTPTEEELECPACGGELDYETRYFN  
HKGLYSCRDCEFSRDPDPVAVVRLKGGPDEWEVTL SYDVTNAVIGERLEGKVTYEL  
PLPGLHN VYNSVCAISLYLAVTPRPEDPEG TIRRVIEGLNPLEFIPSGRFEVLNVGGK  
PVGVGQGDNGDAFKANANLMLS VAGDVGACVYTT PDEGEHP IFEMHRIILRALEPD  
ELYVFPGRESVKAAEEYEEELTEEFDAEFYPI PHERMQEKVEEMRRVCEEADGPVF  
15 ASGCGPEREMWEALKREL RGG

15

<SEQ ID No.:0927;PRT;Methanopyrus kandleri>

MGLRRLGLVGVGLIVLYFTLLSAEYSEFQRFLGDPWGRAVYVKLHNPDIA PGTPHI  
RTLVDFAKQHGYSKILVIHNAGKIGYSHFWYHGILIIQLGWYDYRTVFAQELGLVME  
20 DILYGQRPMLGIWIADRREYRSMSEAVNHVRDLES AVPGRTMVVWHGSCRNGNPL  
WNLGCGAEPYFWILSAYGGRVLALTFAVLGNFAPIVFYGDAALAE LRNYDKLQALY  
NSGTLNRYAVDPYLRKKPMPMGPRGVYD

20

<SEQ ID No.:0928;PRT;Methanopyrus kandleri>

VRPVLEPLAEYHSIDDELAARFMVARTLPVETTEGELEDLWKEHEEAMEEF RARW  
EERPAPGDIEETSPNLLDLKLEIARKILRECTFCERRCRVDRTREDGFCRVPIKPRIS  
SEFLHMGEERVLPVSHTVFFCGCTFCRVY CQNWDIAFRPTNGVYVKPESLARVIRH  
RRSQGAKNVNWVG DPTPNIH YILEVLRRLDVNPQVWNSNMYL TEEAMRLLDGV  
IDLYLTDFKYGNDECAERYSNAPNYWEIVTRNHREADRQCGLIVRHLVLPGNVECC  
30 TFPILEWIAEELGTDTPLNVM PQYRPEHRA YEYPEINRRPSADELEE AWEKARELG F  
RYYRL

25

<SEQ ID No.:0929;PRT;Methanopyrus kandleri>

MSKLDEIMVKGDPPELLGDHLGVFTARSTERKVTKVTQDGGIASAVMIYGLEEGLFD  
35 GVIAAVADPDDPEEPWKPRPVITDPDEVLEAAGTKYTYCPNVSVLKEAVRSYGCE  
KVAMVGTPCQIRAVRKAQLCPIGMRHVPDKIELLIGIICMENFPYEGMKTII EQLCGV  
WIREVTKMDIGNGKFWVYTKDGEVKSIPIDETHPFEGEPCHVCTDYCAELSDLTAG  
SVGSPDGWSTVIVRTEKAKEILDDMVEQGLLEVKSIEEVKPGLG LIQKLAQVKKNKN  
40 QKEIEERKELGLPEPGKVHESL

40

<SEQ ID No.:0930;PRT;Methanopyrus kandleri>

LVRWWRRLSRAKTKSTPRSSCDVAYVQLAGCCGCLVSLTD TYERLLDILDSIELVYC  
QTLMDEREIPECDVAVVEGAVCLNDEHMLEEVEEEHADTIVALGACASTGNFMR  
LSRGNQQAAPTHEAFVPLTEVADVDYAVPGCPPAPEAIKRFLTLLLEGKEELLE PFA  
45 KLAEGKTEYCGCDLMYHVVNKSMCMGCGTCAAACPTRAIEIVDGRPVNENRCIK  
CGACFTQCPRTIWP GDEAIKELIMGGE

45

<SEQ ID No.:0931;PRT;Methanopyrus kandleri>

LAEGAVEIQPTTRHEGHAKLVLYVDDEGYVERAFYLN TSAVRGFEALAKGRPAEFV  
50 QVAVMRICGICQATHGTASAEAFERAMGIEPPKDGKLLREL CALGNRIQSHVLHQLL  
VLDDFVEDESEKVEAVKRIQQIRRIGQYVVDVVGGE GGIHPPNIRIGGMAENISEAARR  
KLYRRLREARELMMEQHEFMVNIVERFGDENDLDIDEFGRHDQPFLATHPTYGDPD

50

RLDMDRVVELLPYEEYGEHKEVAYQHRGQIPLYDGVPEVGPARYILFDGVDPR  
GVLYIHVLRSQETLAAIDRAMTILDELNTSGKTLAEWEPKAGVGIGVHEAPRGNTVHI  
AKVNEKGIVEDYRIIAASTWNFPVVEKAIEGENEEYAEVIMRCYDIUASCAAHV/KEV  
RDADSREKIRESVV/LA

5

<SEQ ID No.:0932;PRT;Methanopyrus kandleri>

LSQSVLIVDALGAGKGWRTRSRDVIGAGPRTVASLLES DYEVSLITYEDLQKLGLDS  
VMDYDTVGVSIMTGDERAARRMFDHTRSRTFRFIGGPGAADPNALLKTGADA AVIG  
EAEETLPELLEERG PVRGVYFRRGTEVDFPGPRPISRFRTRVNPEYIRAYAH RWAA  
10 R VYVEIVRGCSNSCRTTFELPDGRKCSGCGNCREGEGGERWECPEGIPPGCGFC  
SVPSIFGPTRSRPLNEVVREVRGLVREGIRRVVLSASDVLDYGRGDLLTDPRTPPPN  
VEALRLLRRTSKHVDVLFVENVKACLLNREIAELLGEYCRGTSVSVGVETGDPRL  
RAIGKPSTLKEALRAIRLLRRAGLRPHAYFVYGLPGQTMKSAKLTAKAMKRAVEMG  
AEKITVYRFRPIPASAFGDFPPGPSRPNDEASRLIADTARRLNEALKRRMIGKRIRVY  
15 VAEPDLRRPRDAIGWPVKGGPKVRLKGARELVGTECEVEITGVVSDKVVSGKVRI  
LEEIDVEALEGRGVPG

<SEQ ID No.:0933;PRT;Methanopyrus kandleri>  
MKLKIWSPVRLFGATPGAVVGISLTDIEVLFDPGGWRPGYNRRVPPWAELPEDLKS  
20 APGLFSRFGEPYPDYTLVTHHHTDHAKHGGEYGEFPAHPGAAERIERRFDYRPED  
PNRCEIVVETVETGHCPGAVAYLVELDGIRVLFTGDVSPETFLDARLPRADVLISECS  
GVPGLHLDVRGLELLCRKAKPRIVVPVHLIAYDPWFVRELDVDAAVIEPHLGLSVDLE  
PALNAEVPCAREYHLCTRCEGRGCPVFRFVRHLRCPECGNPPTLDGEDPESVRL  
VCPRCGTRSN TVDYAEI KAVA EYAMERSDVG DWSPTEARPGEYSSSERRLKEFSP  
25 R PGGGEDRNV

<SEQ ID No.:0934;PRT;Methanopyrus kandleri>  
LRSVEYLAYLRSKYGIRPRRRLGQHFMVDDNILEFMVEAAEVREDDIVLEIGPGPGL  
LTRYLMTRAGQVIAVELDGRMVEILKRELGEAPNLEIVRADFLEYDVPDDVNKVANI  
30 PYNISSPITFKLLELDIDVAVLTYQREFAERMVAEPGSKKYSRLTMVNLLADVLLR  
GVPRRAFIPPRVGSSVRLTPKSEEERPDVDPDTLESVCRALFQHKNKTVRNALL  
LSAHEWATDREQAREVLEELPEDLLSERPLHLPPERVAELAAAI ESALG

<SEQ ID No.:0935;PRT;Methanopyrus kandleri>  
MKVSLAGQTV DVKKILNEIPKRTVTAALLEGGEIVAVEEADDEHAERKLVRRH DVEG  
35 KVVFTARPCLYCARELA EAGVAGVVYLGRGRGLGPYYLARSGVEVVEVHPDEPL  
GYDPVDRLDVLLTFGGNPYLTEEDVAARVYCLLTGRGFDADIAPAPENLSGRVEIMV  
TRGDPDEAVELLKEELPVFRIRRF LISGEFDRDELREILEDIEPRILDPFAVRARIAR  
AGAFSSSREAEVFIGDVLTSVGREVN LNDPRTVTVTVL GPRVSVGVEKR  
40

<SEQ ID No.:0936;PRT;Methanopyrus kandleri>  
MPERLYVRDYM VVGVAQVRMTDTVRDAVREMARAGVHGLAVVGLDGELVGVLEE  
EHIMDLVVERRGDWADILETPVEKVMNPEPAIV

<SEQ ID No.:0937;PRT;Methanopyrus kandleri>  
MEEADNPVLNLVACL SRAFDSLDSAEIKVPEGCRV VWHGEHLLILSKDESMEVRLN  
VPENVTISPRVAEGPMEIRVHVEREEEPERGLEDRLLSAVREFRRRLRELSVSTSR  
45 EEAPSEVAIPPIFEVDSP TLL ELYSMGRISYVFGRT ELKRALFALAKTATVCAAR  
NAVSSPTNLVEEVEADTVSPYLRVGREIVELDAIPANRVISLKKIPEDVKVWWLNV  
50 KYLPRVMAWGVGDITAEIGWRSSDLAVGYVDIQSSLYAHFLSALLNVPLDFDSYMW  
FLQRRTRKRSKRKLWKDEKGECYVFWTQMEAFEKLGVEDVILLCTREECEGWVTE



CVREDTDVRVVEVFEEDTRRMGLRVEELALTLGEEIHDRHPVTPEHPRIPSQLGSA  
PELPVSLDTYLTVAKMAEERILPIISSE

- 5 <SEQ ID No.:0938;PRT;Methanopyrus kandleri>  
MILGISGSPREGNTEYLVRIALEAAEEVSGETEFITVRDLDISPCEACGECLETGEC  
AIDDDMQDVYELMRECDGMIVGSPVYYGGVSAQLKALIDRTRPLRINWELKDKVGG  
AIAIGGARNGGQEHTLRDIQNFFMIHAMIVVGSDPTAHFGGAGVGLPGDVEEDE  
TGietarNTGRRVGEVVKLIK
- 10 <SEQ ID No.:0939;PRT;Methanopyrus kandleri>  
LRRVVILWNPDDPASKNIAESLTEDAELKLTEDLQHYTVETWERDGVRFHLTAALG  
DLIEEDEARELARKFDVIVFASRHESRTKKPSLTVHVPGNPTPEAKFGGKPLEVCTA  
DPAGMKAAELLEKRFRDKRGLDYDVCYEVTHHGPDPGAPCFFIEIGSDEERWTDE  
EAGEACARILAAVDPPDVKAUVGYGGGHYAPAHTDAALSNRKLAYGHIVPDYAVD  
15 HDYLRDQFREVVDKTPRAREIIVDDRNLD SGIVERLEDLVRDRGLRLRDVEEVK
- 20 <SEQ ID No.:0940;PRT;Methanopyrus kandleri>  
VLSREEFARRLEELPDVADSVPHRWQELGDVVIRLFDERAWAYRREVGRILREV  
TGARSVALRRVSGTFREPVGEEVAGDRNAETVHRELGIKFLDPTRVMFARGNLE  
ERRRLLES DLGKLVFDMFAGIGYFTLPAALAGAEVIAAELNPVACRYLVENARLNG  
VEGRVVRVFLGDCREVARFVRAADRVLGMGYLKGTLKFLPYACRAVRDGGVLVVEHV  
FQKRWGEDRVAREVLNALPDGFEGEVLEVRVKSFSPALDHYAVELVRRRR
- 25 <SEQ ID No.:0941;PRT;Methanopyrus kandleri>  
MRVGIALSGDVPGAAERVLEAVERADVDDVYHNVELDADVEEVRAKDPGRALVE  
DLVEGRLDAAVRGAVSGRCVRELVDALDPFTGRSTVLEAEGRRVLLAPVGIDEGW  
EVESLVKLGELAA RFHRLTRREPSVAVVSSGRLEDFGRRSEIDRWLADGELVARL  
LKERGMEVEHV GILVEEALERDVVLFVNGVLGNLTFRCLSLVAGFRSHGAPVLAAL  
RGVVFVDT SRAQRASGYARALRLAAELAGG
- 30 <SEQ ID No.:0942;PRT;Methanopyrus kandleri>  
MSRVVLAYSGGLDTSVCIELLRERYGYDEVITVTADV GQPEEELREAEKARKLADE  
HFTVDCVDEFVCEYCWRAVKANATYEGYPLSTALARPLIAQKVLEVARVDADAVA  
HGCTGKGN DQFRFESYLRAHGGEFEIVAPVRDLNLTRDEEIA YAEERGIPVPVDV  
35 DSPYSVDENLWGRSIEGGVLEDPSEEPPEEVFEWTVSPAEPDEPEVVEIEFEDGV  
PVEVDGRDDPVEIVRYLNETAGEHGVGRIDIIEDRVIGLKSREVEEAPAAVTLLAHR  
ALEAFTLTRRELSLKASLEEEWARLVYDGLWFNPLREHLEAFFDSTQRHVEGTVRV  
KLFGKSATVISRES PRALYEEELISYEEKQFDQRTAEGAVKLHGLQERLALRRRG
- 40 <SEQ ID No.:0943;PRT;Methanopyrus kandleri>  
LSWRVIAVRDLRAWLKDRRLAPTLIMPVITILVMYGAFHDVKPRHVTVAVLSSHSSD  
FDPVLDALKSDDR VGVVHVRSDVDEGKTMVKEGRAVVFVYVPKGFP SDKATVYYDP  
SDPMGSNYVRGV IQRAWVKRVSEEMKKVVRDLQA AFRWMPAPQPPISRVPGNPF  
DFEAPVKGLKYFD FLVPGLVVLTATMG SIFGMGRVMMEEIETGVTYALFAAPIRPRD  
45 VVIGRFLNMSLWGAVRCGIVLVTALALGAKVPHPFLLLG VGILSTATMIGFALLMASL  
AGRSEVAEMLTGALTTPMMFLSGIFMPPSVMPPEWAYEVARVNPMYYMGDAARKA  
ALLGYLDPVDIAVLVVFATVFIATGAMLYDRIREHL
- 50 <SEQ ID No.:0944;PRT;Methanopyrus kandleri>  
MPPAIVAEDLRKEYGEVVALRDVSVEIEAGELVAILGPNGAGKSTFIKIVCGVTRPTS  
GRIEVLGGDPADPEIKRRVGIVPQQGGGLYPEQTVRENLRFYSKLYGREPDPEPLEM  
LEVDRFMDRKAGQLSGGMRKRAAIAITLALPEVLVLDEPTNELDPMARRDVIRVTK

EFHRRGTTVLVSHDVYEVEQLRPDRVLIFLEGRKELDEPFDEVMERHGSVLEAYE  
GVASCPGE

5 <SEQ ID No.:0945;PRT;Methanopyrus kandleri>  
LITSHAHVPIPSDPVERIRALRVLREAYRRGKKPSLEVYRTMGGSTCGPYVVARW  
RRDSRFKHGRTLYLGKPENESVRFVEWLVS LDRGEVLELARHLMRNLRSVLKTLLA  
EVSDLPYKRARRVLARGLSLAFNARPSESPRIRDLEELPDRLESFLIRTLGGWPAH  
YSIHLRKVIRSRKRS LDGRYEIPDVGLELEHWRLRHGT

10 <SEQ ID No.:0946;PRT;Methanopyrus kandleri>  
VISHVGIVTIIILISKLISPSRKRFYRTLAFVYAVLGFIPPAWLLGGFACHRINLDLRE  
RGCASERHTPRYAVLTILTGLYQSYWWYVTTEDVNRCLRE

15 <SEQ ID No.:0947;PRT;Methanopyrus kandleri>  
VVTIPALIVLFTVLGPVAAAGPVNLSQTS GGERVIVAFNPDDPNAWSAVHRHPVGLER  
GPWAGNFYDARCFPNEVTTHGTFKVFEEKSGGLVYGLKVEPGDSITLPEPASVVSVA  
YAAVCWWENGQPFKRVTLIVEDSHGRQATTS LTLADWCARAFSPHAPDHNFLVCE  
FDHRLSVEERKIRFFIIPGITWKWRVAGLKCGVWAFRLSASELGLRDITRIEFYGD  
GHLYILAVTITPTGPFDDIVGGPNCSGTTVGP DGMDEVGSCYWEGEWPARFGHTT  
20 VTANGVPFLIPPASGPNALLANGRLVELPRPARTVWFLYAATNWWFGDKPYGPVDL  
VVVDDRGRVTARVLLVDWCAHDVVPNNIEVLAFNHRAIPGGLQSIHCGVWAFELD  
AGQLGLPNIAVYFSPMGRRKVWILGATLDGQPVGLGELRPHRISHPWSGFKRGV  
VYPGETLDGTFLLPSECRKVQRTPIEGLADGNAERPLELEDGRGRERHLRTRG

25 <SEQ ID No.:0948;PRT;Methanopyrus kandleri>  
VGNDIVPIELHTRAFDAVGTRIILPEDKHVTAVVLYAATCWWDKDGNPVDVPMPTV  
CYDDGSAYSTSVGIIDWCATDPRAYDDEKRRVAAACAVLPQLEAHWVRGEPLVYQ  
TPTLVFPKRVFADGREEPNTKRPI LWLLKFPPDKRPTWIEFGYHPGHLWVLAITV  
RTTDGKYYALDKDGRDRLGEPEQKVLEPNGGELLTADTSGSLFGTSVKVTAEWC  
30 WPKNAQVEALNLKFEWPLTTTALGSALSVTVRVP SGHLLRDAIPTDDWYWKWLRD  
QLRDEIIRSADNELRSLSLSEEEKEIARRCIEYSANLTANTARGDAFAALT LVALYDRL  
ASRIAEKLGHVHYRAVPAYVTVLTAWRADLWAILEHVNERISKH SKVLTSLALPKG Y  
DTLRHIAFTQFLIYQPTLGLEVYGPSLEARAVNAVLSLLPGLEQTILEIGRGASVAEG  
DRVDVDWQEV RDKLGNLREIGIKDPEGTAQEIVEALKYLT ELVKYEDMDERL KSA  
35 GVQRYVDPFLERVPVIFNRTPSLEAAVLSYTDVATWTTTIYTLFPVPSKGASTPSGC  
FCGPMTDNLKRFWNSLADSILYFLAYHALGNAAISLAISLLIGGAIGEIAAGVLT P VIVA  
AIKAGYFNDWSDWNKLKMFANETASTAPASFTAKLQWAIHCYGGGRAKAIATTVSF  
AFAYLSSVCTGAKLP

40 <SEQ ID No.:0949;PRT;Methanopyrus kandleri>  
LYRGETAVGGSRVGDPWEELERFSDELLEFSKRLDVELSGEELKATKRRVEHVES  
LKIKCIIVIPILALVGLAINGKMLSILASIYYEYPAYALTHAAVLAWDVAVIYMLRPGLY  
RKEKRALELALRVKKPVLAYFSLYHPLTAPLAGFIILIFSSYKPLHILYKNPKGAIIMVIA  
YHVQIFIPLISYLVRLRLTRTPVILSYSLIVTKFAVGRPVAVEKLWQEAREYRPLTLPRVA  
45 FIGVSLASTIGMLLLIGLVRLHIEYSTKGIETIARMAPLVTLGVTPIVTVKARNLLARVP  
PTTIAEGILTALNVLA AFTYTIPFFVILLYYCLP

50 <SEQ ID No.:0950;PRT;Methanopyrus kandleri>  
MELERVAEFELEDIKVVVLRGDITELNADAVVNPANSRGVMGGGVAAAIAKAGGEEI  
EREAMEKALIPVGEAVETTAGDLDAEYVIHAPTMERPAQRIGVENVREATEAALRKA  
EELGVESVAFPGMGTGVGGVPYEDAAETMVEVIERLAPELESVRAYVLVGYEEELA  
EAFRRALERRVG

- <SEQ ID No.:0951;PRT;Methanopyrus kandleri>  
VNGLKPCSVRALPVRGSDRVPWSALAVMMGCFVGFHFLSELLVDATVGLARKYG  
LSESVAGATLAAIGTSAPEFGSSLSSILLEHPNVGVGTILGSAVYNVTVIPGLAALAAG  
5 GLTLERAVYRRDVLFFYLLALVVLVSLWDRVLRVEALAWVALYGLYVLLMRRTDE  
STIGAEGDTGEASRLSLVVRVSVAVVGIAALS DLMVRATVDFCEGFGLSERVSLLL  
NAAGTSVPDTLASVHAARRGFGSLAVSNAVGSNTFDLLVCLGVPLSLVSRTPVHGE  
LGATVLALVGCVVLLYLVTVDGKLRNVEALALLGAYAAFVACLLVL
- 10 <SEQ ID No.:0952;PRT;Methanopyrus kandleri>  
MGSRTMSD GALREWEGR TWEEVDGKVRCLVCPRKCVIPEG ERGFCRVREN RDG  
ELVLLIHGKVSTAVPDPIEKKPLFHYKPGTDVFS LGTVGCNFR CRHCQN WQISQAG  
PEEVPLEEWPPERIVGA AKRTGCESVAFTYNEPIIGLEYTLETFEACRE EGLGCVYV  
15 TNGFATRRTAKILGEV LDAANVDLKAFTEDFYRDVAKAWLKPVLRTCKIWKDMGVH  
VELTTLVIPGYNDSEEEARRIARWIRKELGPDTPWHVSRFHPDYRMLDVPPTPVETI  
EKFVEIGYEEGLYYVYAGNVP GHKYENTYCPECKEPVVVRRGFSIVKMHVTDDFHC  
EHCD AELHFVT
- 20 <SEQ ID No.:0953;PRT;Methanopyrus kandleri>  
VRAYLELARPINCAMAALGVVVGELIAGARLDVGAVLAPVVAAVVCAGGNAINDYFD  
AEVD AVNRPD RPIPSGRVSPRSARMFALGCF AVGVGMATVINRMCLAIAALNSVLL  
YLYSWRLKGTPLIGNVMVS YLVGSCFLFGAAVGQRPAPAVWLFLLAFLANLVREILK  
DLEDVEGDAALGLKTLPIAYGEGVALRVATVFAIALAVLTPLPYLDGVVGWPLYLV LAL  
25 PAAAVILLASVLAVAGSWDAGKAQRVVKVGM LLLGLLAFLASLL
- <SEQ ID No.:0954;PRT;Methanopyrus kandleri>  
VVSVAEEKVT VSVIKADVGGFPGHSEVHPDLLEACEGVLEDAVDEVIDYYVTRCGD  
DIDLIMTHTRGEDDEKVHELAWNAFQEATKVAEDLKLYGAGQD LLSDAFSGNVRGL  
GPGAAEMELVERPSEPIIFCCDKTEPSAFNLPLFRIFADPNNTAGLVLDPSMHDGF  
30 EFEVHDVIDQKKVILKCP EEMYDLLALIGQTQRYAIKR VYKKGDGDEAERIAAVTSTE  
RLNLIAGEYVGKDDPVAIVRCQSGFP AVGEVLEPFTFPHLVAGWMRGSHNGPLMP  
VSEEEAHPTRFDGPPRII ALGFQLRNGELVGPQDLFADPAFDRAREIANEVADYIRR  
HGPFPQHLLSEEELEYTTLPDVLKKLEDRFEDLEE
- 35 <SEQ ID No.:0955;PRT;Methanopyrus kandleri>  
LFPGGKIDPRKLQRLMREMGMEQEPISGVERVEIHLKD GSKLVFEKPQVIRMKIMNQ  
EFYQVAGKAKREKPEEEPF TDEDVKLVAEQAGVSEEEARKALEETGGDLAEAIMRL  
QGE
- 40 <SEQ ID No.:0956;PRT;Methanopyrus kandleri>  
MSRYVEIVRGILAYQFGREAADAML DGEVKVRVRRGRPREVFVDGKRLCTVRASD  
GLVSLAPEGARRLHAATEPPEHRVVCAD EWVEAVRRGRDLFCEYALRGWEELRP  
GDECLVSEDELLAVGKMRLSGWEVEYFEHGVAVRVRRL
- 45 <SEQ ID No.:0957;PRT;Methanopyrus kandleri>  
LDPDVLLRHAEISDACVVYALEGELVEIEASNGELRKADSDRVRTYAVRVLKEGSW  
GVASGPDPERDLVERALRSTGEGSAEIP EEPVAAEGSYRWEGKLSPLDSLDEAAEL  
AVELSREVS YDCEITYSAGSVRYTITSTWGSECEVRLDCVNFGVKVSGKGTAGREE  
YTERD GANCAGLELFLERAE EVRDEAVRRLEDLLEAEPGP ERAESVITDPELLGVIV  
50 HEAFGHAVEGDLVARGESVLQDWVGERVASEIVTVVDDPTERGAFGSYPFDDEGV  
EPRRTVLVEEGVLRGYLTDLTSA AE LDLEVTGNRLESIGDHVQVRMSVTYVEPGD

ASREELFEEAGDGAVYLLGSKGGQTDATGNFQFSAKLGYYVEEGEPSRPVRDVG  
LTGETLEFMKRVRLSDELRLHPGYCGKGGQLVPVSDGGPHALVDGPFHLRSG

<SEQ ID No.:0958;PRT;Methanopyrus kandleri>

5 MALDDPLSQFEPGRAVLLEVETERVEVERTHDTGDRGRVSADRTIVRVSTDGGL  
GVATVADPGEVDTAVERALASAEMGTSEPVEYPDSDPARVSSCDPSAVDEDELW  
DLLEAVVNEVSDDVTITSVSVTGVRRRVIFRTPSDQAEREESVTVSLDVIGEFSGF  
AWDTAVGPRDIDPELLAREASEMASEAPKERVSGGELAVAFHPRAFSELLTYVLIPA  
10 LSGLEVLKGTSGFDRGDIGRKVGPESLRVNDPTLDRRPGSYAFDDEGSTPKRME  
LISDGILRSFYTDLYSSRRLGMESTGSGLGIRPEPSPANVIVQGDASEEEVLEEADL  
IVYRTLGAHTASKVSGRFSVTALWAETVEGRAVPVSVRGNLYSSLRDALISEETERT  
GVVEPPYALLRCRVG

<SEQ ID No.:0959;PRT;Methanopyrus kandleri>

15 LDPLTEDDVELREITLMVPIAEANLISNHKFRNRKRDAAYASYLVGSSSTDVDDVIPV  
TVRIPWPKDVKAPREMPPLVPGTLTHHRRFCFTVPNPPETRKLSEKTLVTAALLRTL  
HELDLTSAIRY

<SEQ ID No.:0960;PRT;Methanopyrus kandleri>

20 VADVKGIGFEVHVQLDTRTKLFCDCPTDYEDAEPNENTCPVCTGMPGAKPLPPNEEA  
LLIALEIAHMLDCEPVLDRPLYFQRKHYDYPDLPSGYQRTSVPIAVNGELDGVRIREI  
HVEEDPGRWEPSTGRVDYNRSGVPLIEIVTEPDMRSPEEARDFLRRLMQVLRYS  
KVKGDDGGIRVDANVSVEGGARVEIKNINSIKGVYRALRFEIQRQLNLMKHGREVRRE  
TRAFREDQGTTVAMRSKETAEDYRIPDPDIPVFEITEDLWEKAVARAPEPPHRA  
25 RRMAEEYGISLEAAEALVTEREWADFFEEVVEKAPDDWDIEFIDQWVRKEIKKILNK  
KEMTFREAKITPEEFIELLELVREDKITRQNALNALWEAVDSDKSPVEIIEENGLLKVS  
DEDRLARVVEEVIENPQAVEDYKSGKEEAIHYLMGQVMRKTGRGQADPEVTMRLL  
RERLSDSG

<SEQ ID No.:0961;PRT;Methanopyrus kandleri>

30 MGVGEVVDNIGRGLLSEDRRAREAAARYREWAESLDEEELFRYVRERTGGLGHGK  
EGFEVGKMGKGYVIAWPEQARGMVLEIGTGLGRTTWALLRWGDPELIVSVEVDP  
RMLAIALYRNPVPEFSEALRDDRVKILLGDAVEVVPKLPRGFDHVVDHGGPCPGRN  
PRLFSPEFLRTIAEKLKDEGTASVFAGRDPRWQDRIYRALSRLFLEVRAESFPDPT  
35 VVFRCEGR

<SEQ ID No.:0962;PRT;Methanopyrus kandleri>

40 LPEDPLRGYEPSVRDYLRCDTDEEALVLQYLVKRGELDEERASELEREIREKGV  
RSLVERRHFGYYLERYDPEERRYRG

<SEQ ID No.:0963;PRT;Methanopyrus kandleri>

VERSAPVAGQFYPADPEELRKMIEWCFRHELPGDLPETNDGPCTLPGVVAPHAG  
YQFSGPVAAHTYKVLAESETPETVILGPNHTGLGSAVATMTDGAWRTPLGSVEID  
SEFATALVRKCGVMDDDLTAHANESIEVQLPFLQYVYGESFRFVPVCMAMHDLQT  
45 AREVGEAIVDVAEELDRNTVVIASDFTHYEPHDQAQKKDRKVIERITALDEAGMIEI  
VERYNVSMCGVGPTAATIVAVKAMGASEGELLKYATSGDVSGDYSQVVGAAIVFR  
RG

<SEQ ID No.:0964;PRT;Methanopyrus kandleri>

50 MHPIESLDLALTALIAGLILTSEALRFPFLSYLVRVPLRPITLVLALAALVLTFIAPIKGY  
VPTLLTLLCSVKLSIGGYLLSRVWVVSGLRDGLIGALRLSLEIRTLPDFLSVGCAL  
TASGVLGVLRWMTSVPVAVPW

<SEQ ID No.:0965;PRT;Methanopyrus kandleri>

VEMEREFEEALRNSKTFLRSIDRVITDYPKWRTVVVDLEEFDEPDIAFAVSDDVVEA  
MKVVQRVAMELIKKEPDRVWVVEFRGSPIRLRARDMSVEFKDRLVTEGIVRRV  
5 DNVAEEVVRVEAECPCQGNRFEVRRREYRPDVRCPNCGMRCEPDELFYTDYQLV  
VLQEAPEHVRGGEQPATVEVEFRYDHINRVRPGDRVRVTAVPRVRLPSSSPRPGD  
TGEIVLEAHGVERSDSPLPEEDLRFTQDEVERFEELAEGDPLGEFVEAVAPHIHGHE  
VIKAVSLQLFSCVEEGQIRERVHVLIVGDPATAKSQILQHVEHLAPRGVYVSAQHV  
TGAGLTAAARTEDGWTLEAGAVVMADGGVIAIDELDKASRGDLNALLEAMESGKI  
10 SVAKAGITTTLNARCAVLAAANPEAGRWQGGHPHIEINLDPALLSRFDVILFTRDEPD  
PEQDKLVAERMMEAFDGEFDEIEGKYELLRRYVLYATKEFPNVTISEDAREELRDW  
FVSARQEAADRIDEGLRTVPVTRRQMGSVLRLARASARMRLSETVGRGDVSV  
SVVEEFMKEVMQEDGVLDAVIETGKPKSVREVREYVLKVVRKLAKKHEDGVPKR  
EIVKAVKHRVSRERVEEILDDLVEEGSLLQPRPGVYLPM

<SEQ ID No.:0966;PRT;Methanopyrus kandleri>

VNGWLNMSSELSRRYPVVRVPAGELAHSEPTEDGFVTPRGVRFHRLVVGVLSGR  
YVDEEREFVITVTDGTSVDVFAFDECYEPARTLDKWRQIKVIGRPMPEPREGR  
20 VALRAEVIRLTSYSEELFRRLEYELMAGGEVPTVEKPPTLDEAIEMVYKELLEREET  
FSREELYEVIRSVVPLADEEFCEKIIKEMEERELLYPMDLPGGKRWSVIETGWGL

<SEQ ID No.:0967;PRT;Methanopyrus kandleri>

VVEYDYEELLERAYEQLPEEVLEDRRFEMPKPKVSVGKTTVIRNFKEISKKLDRDP  
EHITKYFLKELGTAGHVDGGRILHGVYHPKLVEEELKNYVEEFVLCPECGKPDTKL  
25 VREDRQWILKCEACGAWSVRRLK

<SEQ ID No.:0968;PRT;Methanopyrus kandleri>

MARVLLNIHGTGDTVVLLALCDEDLLGVELKYKGRTLHISEPFYSGKSLEPDRAAKKIR  
EAVQEYEDEKTVAINALGELACSVVVDAGLAREDEIGELGGVPHVQIYILPREPFL

<SEQ ID No.:0969;PRT;Methanopyrus kandleri>

LTSGVLCTTAPGLEDVCAQELGEITGKSVRENYLGVGRVLEVCSEHEALDLAREIN  
RRSLTVHRAAVLLGGFEIEHRDERGLEEIRERCRELPFERYIHEHDTFGVRPSRLGE  
HDFTSVDVGAAGDAVIERIKREEGFRPQVDLDAPSVIVRADVVGDTVIVGVCTTGD  
35 RSLHQRGYRVYDHPAALNPVIAQGMLELAGDPDSLIDPTCGGATVPIEALLRDPETE  
AVGVEKFRTHYEGARLNVLAARVDVELYLADATRLFEVPELDRDREFDAAVFNPPY  
GLKIANPRVVKTLRGLARVLSDLVSVVVTVTPRDGWMRAAMEEYGFRLSHDRWV  
RHGGLDVRLLVFR

<SEQ ID No.:0970;PRT;Methanopyrus kandleri>

MRSVGSPPMIKAVLFDVDDTLYPSSKLAEEARRNAIRAMIEAGLETDLSEEELYREL  
QEVVKEYGSNHPRHFDLLRRIGADPEPKLVAAAVVAYHDTKFAYLKPYPDVIPTLM  
QLREMGFKLGAVTSGLAVKQWEKLIRLGIHHFFHEVVISEEIGVEKPNPKIFIEAARRL  
GVKPEEAVYVGDRDKDIRGANRAGMVTVRIRRGKYQDMEPRNDDVPDFEIDRP  
45 RELLDVVRELAKD

<SEQ ID No.:0971;PRT;Methanopyrus kandleri>

MGGLPTLRIEVPPLERKVRPGDDLAELIAESAELEEGDVLAIAHTVVSKAEGALISLD  
EIEPSPFAKTLAERTGKDRVVEVILREAESIVRVGPDFIITEVRGGMVCANAGVDES  
50 NAPPGYVIVLPEDPDRSARELRRRLRELVGVDVGVIITDTQGRPFREGVVGVAIGAS  
GVPVLADRRGDRDLYGRELKITIVALGDLLASAAELVMGQADEGTPAVIFRGLKPEL  
ERFEGPRKARAIIRSPSRDIFR

<SEQ ID No.:0972;PRT;Methanopyrus kandleri>

VAVFHYPHCENTASGITDVIKGLPGNGAIEFVGVHGTSHSIAGLPEDVQKMEIQYC  
 WEFLEDQQLGPYLKDIISPSEWIMDDTFVKVCQELGTREVVCGYRTWELDPDKH  
 5 PRWYGKDYDYIADIMVIKKLNTNGYTVYVCPVIDFEELVGDVDELGVYNLSNLKTM  
 LRKAJETLRNTGAIRDGSHLMMWVLIHPWQLTEDIRVGRNDNTRPGMELIEEFIQWV  
 KKGQLDYEVNGINIKFVLENPSDAIRIERNIEQNPTAYGHPMVTVTKLDWVSMIKASG  
 GKTARELKHHDHQLVDIWERAMKKLQKVAPQLSSLRQTVDRLVYDVLRATNEFRL  
 10 SVMATKGDFWGTKYDATQYVQMWEREIQILEGADSGDDPVRGNRVGPGSPGDGV  
 QAGRSDHQGTVPREQVVLVTDYPHGGASERSEDRLRGRLRGPDDPVSSDHPRME  
 DHRRRDRDQGPGEQQRAGQGEVRSQQRSERGAGQGGEARGSRFVPAGVPGKDR  
 GGVRETRDLADTESDDHPDDERYLHGQASSGVGIGRAQGEGHLGITGDVGGQLLG  
 DH

15 <SEQ ID No.:0973;PRT;Methanopyrus kandleri>

VTTENCDEVESVTIELLRDGMVDRKTVSSPQGSVEFTVTEEGEYQVRIIVECTRGVT  
 AETLTNSVTVRFPSASVSGGLSIESVSSSSAVLKVDYSVTTEDCSVESVTVELLNG  
 HVIDTKTLNSPQDSVEFTVTQEGDYTARIIVQCTSGVITEAMTNTVTVRFPSASVSGK  
 20 LSIKNLGASSAVLEVSYIATENCNVNSVTIELLRDDQVVTTKTVNSPQGSIEFTVTE  
 EGKYKAKIARCTNGVTIETLTNAVWVQFPSTQTPAGIRFDLSILSPLAAIAGIMLAWQL  
 LGQPVTQTTSETVEAPTIPNKQVTAKEVQKEGVEQERKTTNVPETEKIKEGKELGKPL  
 SELRSREEVEKVRGAVEVGESVRSSENGSSRRRGGTTGVLVIGKYVTGIPGVLALLA  
 GVCVVGAALIFRCRR

25 <SEQ ID No.:0974;PRT;Methanopyrus kandleri>

LHYVLECECGSEFDDDSLVRCECGGLLEVALRYDEIEVSRSTFEGRRLGWWAFR  
 ELLPVNTDDPVTMSEGGTGLHPCPRLGEELGVRELFVKNEGENPTGSFKDRGMTV  
 GVTKAVELGAEVVACASTGNTSASLAAYAARAGLTCAVLLPAGKVALGKLAQALFH  
 30 GARVIPVNGNFDDALDVVKLADEGIVYILNSVNPFRLSGQRTIAYEICLQLDWEVPD  
 AVVVPVGNAGNISAIWQGFLDLYRLGIIDELPRMYGVQAEGARPIVEAIRRGKEDIEP  
 DPEPETVATAIRIGNPVNAIKALRAIRCSGGWAVEVSDEEILSAQRELATREGIFVEP  
 ASAASIAGLRKFVEEGEIDADERVVCVTTGHGLKDPETVMEVCPEPVEPDPETIQ  
 RLIAE

35 <SEQ ID No.:0975;PRT;Methanopyrus kandleri>

LVVPTTEEEPSKDLPPERVFAYGTLTDPEMVVGVNLRLPTIIPAVLEGYELALEVDG  
 GRYNTIREREGSEVKGALLVGLSDEDIRADRYEGYPVLYERERERVEVKTSLGSYEAY  
 VYIARE

40 <SEQ ID No.:0976;PRT;Methanopyrus kandleri>

VLRRIPRPYTRTRPLLPPSGPSPVGTFFDDHLFPRTRTLPHGSPGGTRPLARLMRLSF  
 RLPSLRDCVLGWILLGISALYSPHLTVYVTLPALASFVILLDLRLAKRDVPPNRWPF  
 VGLVYAVPLVLSVPLGTAVAVTKGVMSTFLTALLGTVRSGVLRAPVLAAYLVIDSL  
 45 ALATLTGVPLPPLLLASLTGGVVGAAVAVVDTLTLASLGIRTTDAFGEFLSFKSGRD  
 HSLHSLFRGMETRTRVRVPVRVFAFMTKNGDVKGCFVIPWIHPGPLGDVGGGDLP  
 GRIVRRLKEGIVPLVFHSTTHDFNPVDRREAGKIVEETVRLVREAADREGCSVGS  
 APVRGEETDSVGQILGDRLFLVLSKYPEPSDDIDAATGIALERETGGWVADCHNCF  
 GDPDRGRVYAFSEDFWRLMRDARRISERVEPTPGLRAGFDHADPGDPETGLGS  
 50 GGVSVAAVEADGTRTLYVVFDSNSIVRELKEEVERTLRDLAEEVVVCTSDSHEVNP  
 RGYNPLGQIMGRNDKRRLKAVRCAAEGAIEDLEECEVVPVEGWVKVEVTGPGSF  
 QRLVHSVETTRTVIGVLLPTAFLGVALLSLLFGIRT

- <SEQ ID No.:0977;PRT;Methanopyrus kandleri>  
VGLGRELRRIGLEPVFSSFGEGREMLMREFPDAPVYGLPKIELFSEDGSFDLLLLLR  
RHPDLPLRFYAGVEADRRVIRRHGCKVVVSDCQFHALVAAQIIGVPAIVISNMLRVP  
GEGSLVRLINGMLRRMFELADIVLIPDTYDDTYDVPEIDTEVWVGPILKRRPDELPP  
5 RDAVRRKYGIPDDATVVLVTAGGSKYGRRIVRIVAVEGLKLLSKSIDVFPVIIEERVGD  
GLGLQLRYVDNLELIKVSNVVITHGGHTTLSECACLRTPVVSVPPLPNHPEQHMNAE  
RVLQRGLGVAVPPEELSPKRIAEAEQAIDWKVPKIRMMMDGRGAERAARIVAGTLD
- <SEQ ID No.:0978;PRT;Methanopyrus kandleri>  
10 LTSKELGRQLIHATFGLLFLPLHMLGVYEFALLLSGLIAGVSVSFALRRGLHVPIAK  
ELVDAFERPDEMHIPIGQGTLLHFVTGLLLATIICPYTKVLDVTIIVLSVGDSASTIAGKAI  
GRIPIPYSSRKTVEGSLVGFTAAALASLAWTGDVWVSALAAGVGMLVESLPTPNDNV  
TIPVAVSVALGFWWGGL
- <SEQ ID No.:0979;PRT;Methanopyrus kandleri>  
15 LRWNLTVGVTALALILLVTALAPSYIPAACLLEGGSRPKLVAFGLLTAFLSLSAVVR  
KRPDPLITSLLLLVL PFTSNLLHCVAAKSIGVPPGSEFFVFNGRVLEGDSPLHTHIGK  
AALTWALERVCRISLYIHCGMSLVETYPYVLAAEFVVVSLSVLLGVFNTRDPLSCLA  
SSLLVLSSIDGGAFSLPYVHGSWLLALRYVREPELMIILLWFAALSPYCKLVLTLLT  
20 HAYYGERWDSVRLQVLGAPLDGPLKSLGGVRCDDGYVLPVRSCAEWKEFLRNLE  
DSLRRSKVRWVAFCTFPNMAMYL
- <SEQ ID No.:0980;PRT;Methanopyrus kandleri>  
25 LTAITVLEKPGIRVKARVKQGRVSFEMEGKLASLLRPLKRLFEHLEEEKPAAVREDRI  
VFSLYLPPFPSPRAFTRLLRARLKSEVLGRRVPEAVTMAVTQRCPCNCVHCSADRRR  
PTELSTEDWHRAIREALDLGTYNVFTTGGDPLFREDLPELIQAVDDDDRAIATAFTSG  
YTLKDRVKEKELKEAGLYAIHVSIDSPDPEEHDELRGVPGLFERCISGIKAALDAGLLVG  
VSTYATPETVETGKVEDVRLAADLGAHEVTIFDAVPTGRLLHEESVILSDEHREDLI  
30 DLHLRWNREKSSGPRVSAMSYVNSEHGAGCFAGYVQCHVTNDGEVTPCDFTPISF  
GNIREDDLKAAWKRM TSHPEWGKWRPHCRMQDPEVRRRYIRKIPPDATLPVRIDE  
LEGDGS
- <SEQ ID No.:0981;PRT;Methanopyrus kandleri>  
35 MLLRVPYLPQVHSHRGIPLEAETVAIALTIILAAMALGRAAGMKFRYGILYRATRSVG  
FMDRWLEHTLLGPVLKVSVRASPILGFAGLAFAIYTLVKGASEGSGGFTVLLPGITLP  
LISGLASLAVILTVELGHAVAARLSGIRIKRIGFFLVVLPGAFVELEEEEFRRAPLRR  
RIEVL SAGPAFNVLTSFIAMGAVLGLSAIPGYVTS GVMVHGKMFKDVP LHTGEVIRE  
VDGQPVK TIVDLRRALANHKPGDVVQVATDSGT KLVKVHEHRGPV LGVYVIPNFG  
40 GYL VSEVMVALVMFLNMLGMLS LGIVANLLPIKPLDGG RIVHEVLREVLDPSLASR  
LSTTVSIVALILLVLNLRAPYHVLGT
- <SEQ ID No.:0982;PRT;Methanopyrus kandleri>  
45 VDLREVRYTEEHWELLRTLDRARKV VETLSQFGLEGWVHG SVARGDV RPGSDV  
DVFIPTPVSPHVDAFMDAAPFEVVGVTAVLPTPRDCVRIKVAMEEDVEVTFPITPP  
TDRELEFFDFSGKLT PDSLERDERVPGVDKRLRMIEPKPWGHVEYSILGREGEVAT  
KLG VSTQLIHERVRALTRRD KVG VQG VHA KVEGRPGEPVIELLRELGRNP KAAEK  
LSELGV
- <SEQ ID No.:0983;PRT;Methanopyrus kandleri>  
50 LTKPVEPDDPRIRLLAYVNRVKDRAASGGYSGVNRRLTEVLQSIESTLQELRYSY  
LPPENVSERLKD LLLPDLEDVVDPEEP ELRWLVEYLEHADEVFEREIGDEADAVLCVV



GEVGSVREHPNADNLYITVVNTGRFGKRTVVNTLDVEEGDSMAVALLPPREFSGV  
VSEGMFCGEADGEPGEIIEPPERGEVRSIVLEWIEGV

5 <SEQ ID No.:0984;PRT;Methanopyrus kandleri>  
MVSADDLTYREKLVLLALYEEFDGGPAGVKKLAPVVHMDKTKVSRALNALEEKGLV  
EFEHMEGRRLTDEGEKIAEEIAEEMELPEDEGPYQCSDCGRKYKHLRLKCAVCGG  
EIEVNKDHDPDAAKAewnLERARMGYL

10 <SEQ ID No.:0985;PRT;Methanopyrus kandleri>  
VLTRILQVIGVGPEEITVYDKKWEQYRPLVYYANSVLAREEGNLSWESDRCSRTTR  
VT

15 <SEQ ID No.:0986;PRT;Methanopyrus kandleri>  
LTKEHWSEVKAREVTEHCRKHADELPEIVVASGASTSGRLHVG NARDVLTADAVA  
RVL RERYHEDVRVWISDDVDPLRRIPRDL DGR LSEDYLGVPYKAIPVGDEPYSDR  
WARNFVEELREFGAEVEWISSAELYTDNGFVKLVREV VNDY YGGGRLASVLERF  
GLEDARVYMPVCEE CGRIATTRVVDVDGWRIEYVCEGRHEIGDAVLEGCGHRGEL  
DLRKPIEVNGFEIPP GKL GWKIEWPTRWVYLGVACEPFGKDHYVAGGSYEVGSAIA  
EEFFGFPPAPVPVPYEWITLDGKAMSSSKGHYVTLSDWGEVCHREVLRYLVLRGKPL  
20 KHLDLDRFGLLQAVDDYDELEKRYFAGEADERERRIYELSRVDEIPEECPPHPVFR  
FCAVVAQVVGIEDDVSEEEFERALEIFRRTGHLEAEPEGFGREWL RERLEKASRVV  
DRYAPEEARFRVREEPEPVELSDKEREFLDLVRRLESETTKEDPETLQRTVFEAA  
RTAGLRPADAFRVFYNVVVGKDRGPRAGTLIAAVGVDRISRLIRGCLEASD

25 <SEQ ID No.:0987;PRT;Methanopyrus kandleri>  
VVRGAFPKGCRCLVC GAKLVVFTGVCNRGCWYCPVSPRKKGS DVSFANERPIRS  
ERDLVKEAELMDAEGASLTGGDPLTRLERAVNIIRTLKDEFGDDFHIHLYAPAESVR  
EGAIEELDGVGLDEL RVHPSPDSTVNRRAAEVLED SGMDLGFEMPAIPGEENWILE  
VAKLADEYGFDFLNVNELEFTESNAEELRRRRFERVDDDLSDAVAGSERTALTALS  
30 EVANDVGITLHYCPSEVKDAVQFRKRIKRM AKNVARDHEEIDE EGLIVKGIFEVISGD  
PEDLADVLINILEVPEEWVYVDGSRVETKPFVVD ELADVLSDLEEASRCEIRAWIIRE  
YPTWDRTVVERWPVRG

35 <SEQ ID No.:0988;PRT;Methanopyrus kandleri>  
MAGAGVSASREDIALRLRRVSRVWGAALYVGSVLLIVLIAVLGLGALGQYSYQAQVL  
LFGNYRGQLAEIDEKYQVLKTEFDQANHKLQALRDLYPISSADLHQVEKIRAKASLEL  
QSLKLKKKDTEFAVYVLKDPATSD LKLKECMAELRRAEAAVKAFVRAVKGLEDKYA  
GRVH

40 <SEQ ID No.:0989;PRT;Methanopyrus kandleri>  
LKVERHSGYLRFRLYGLIEFEVDPEEFRRMVTAVISKRERRTPVPTLQGTRVAAPVP  
REVLVGVLTDLISRLAGESGKNAYTGRRVYYITETTGIPLIGHTAFGLIDRGTNVIQVR  
PLSGCNLCCIYCSVDEGPISRTRSRDFMVDPDYLM EWFD RVAEFKGGGLEAHL DG  
QGEPTLYPFLPDVVQALKEHPHVDIVSIQTNAVPLSEDLVDELVEAGIDRFNVSVNSL  
45 DPKKARAMAGRKD YDVEHV KRVVEYIAQET EADV LVAPLWLP GYNDD DIVEIIGWA  
AKIGAGKRW PPLGIQNYLEYRFGRRPKFLRRVIPMKEFYRWLRELES RTEVRPLVLK  
PEHFGTEPRKSLPKPFRRGDVIRAEIVLEGR LRGEMIARAADR VIAIPDSAKILNVGD  
RVRVKVTRDKHNIFVGILV

50 <SEQ ID No.:0990;PRT;Methanopyrus kandleri>

MAEERSKDDIPDWWEKEWVEFRYRGYTLGELMKMPIEEFIELLPARQRRSLKRGLP  
SRHKLLRRKVRARLLRRGKKPPVIRTHCRDMILPEMVGLTIAVYNGKEFKEVKIE  
PEMIGHYLGEFAKTRKTVEHGGIGATRSSLFVPLK

5 <SEQ ID No.:0991;PRT;Methanopyrus kandleri>  
MELARECAPELKSGRVKEIYKTLKEMAERVPLKEYSEARCSLMVWVRAEEELPTNS  
IAQYVTS TRYTFEVTVRQADSTS RPRIVEVILERHEARSRGPLDELKVHGSASVDE  
PVERRGRSLIGALKIALRYLREYDVEREWKWKVTNKFREMVQKVTS LGSDEPGIL  
VMEDSKVGTEYDGLFEYWVALKSGSIALSAVRRVLEVDRKLSLYGVHVEVPDARW

10 <SEQ ID No.:0992;PRT;Methanopyrus kandleri>  
MIDVLLINPPDVTTKYQRFLGITAPPLGLAYIAAVLEEAGYTVKILDCPPLDMSFEDLR  
RAVRKLRPRIVSIMATTPIIHQAYQAAKVKEELEDVIVCLGGYHPTFMDVECLKECP  
YVDVVRREGEFTLLDLAKVFDGVKTLSEVLGITYREKDDIVRAPDRPLIRDLDALPF  
15 PARHLLPMDKYTFFGAKTTATTMVSSRGCPVGCDFCASSAMHGHKLRMHSAERVV  
SEMAHVHENYGSIIAFVDDTFTYDRRRVEEICRLIVESGLDVTWGCAARVDTIDRE  
LLELMREAGCSVLFFGVESGSQEVLDNVGKGFTVEQTKKAFQLCREFDIVTVASAVI  
GLPGETHRSARQTIKFLKEIDPDYAVVSVATPYPGTFKYQEAVEKGLIEEKSWDKYT  
LMDPVVRTTELSPEEVKKYQKRAMIEFYLRPRYLIRRLKEDGIDAVRVTGTMI AEVAF  
20 KKMKALLAKIPSPRFSHRKGSD E

<SEQ ID No.:0993;PRT;Methanopyrus kandleri>  
LRISVKAPLKAILAGEHAVVYGYP AVAVALD TYVRVTAEPGDDSF RVETELSCEGNV  
RAEITRDGNVKGFRSESLHEELTYVATAVRKASEEFDAPPSNLRLSEAPPASGLGT  
25 SAAVTAAVLLGLAEVSGVNVVSREEIRRLVREVELEVQ GKASWTDATVVTYGGFVRV  
SGREFELIEPERNPVLVVAHSQEPSRTGEMVRRVAELRERL DIVDGMELIGELVDD  
LEAALRDGDLRTV GELMNANHGLLAALNVSTRALEEIVHVFRSAGALGAKVTGAGG  
GGCAVALFEREEDAKRAVETLSALGYEAFVTRPSPCGVKTEDSGS

30 <SEQ ID No.:0994;PRT;Methanopyrus kandleri>  
LMLPKTLKPVEDKYVESLEELADLIASADLRTGVVRITARSGDALLDAFIVVLNGKV  
VYIEVEEVRTGERWRGEEALEHLREILSAIEGGQSAVVDVFEASEDDIEMIFEYHGIR  
PKEIELEDVLPVPALEADIEFETEELEGAEKEEATEETGIGVEEIEEAYDEEPEAVESY  
DFTEEVEREPESLSREEILKKYGIKEPDES FVENILKEFTGVETDLRERISRVLR SYGI  
35 TVFKVEGIVEVLLGNDTDEEEV VETIRDFMKDAGVDELEV RTYRPEWLGRKI

<SEQ ID No.:0995;PRT;Methanopyrus kandleri>  
MSVDELPFDSVAVIGLGVEGRTCAARLAELGLKVYASDIREDVDVSSLERLPNVEVE  
LGHHIDIRIREDTVYFSPSIPND AEIVREVRNIGVP PLEDLLTWP DSSKFVVVSGTN  
40 GKTTTVH MIDHLLDKLGIDRKIGGNAGGGFDGYATLYVRAELARPEVVCEVCDMT  
LDYFSDRAPRYDVAVFLNLGLDHL DYHGSIERYAARAARFC DRARETAIVKCDGEE  
RKVVERMESTPRCYDELDVEVDIPLRGEFYRLDAKAALLAVAEITSEPPEELAPLLSD  
FTSVPGRIKEYKLGEGRLVIGKTDNLSALKV VLRDYGPLDVVFWGT PRPGEDYRIEG  
IGRTLREAGVERVYVFPGLSEETVDDVIEELTSSGIEAS PVEPSEVASKALELARRGR  
45 DVGVLGNGQDVII SIQH DVERAVRFLTAGSERSRG

<SEQ ID No.:0996;PRT;Methanopyrus kandleri>  
MEVEFIRLADEIPECEFLIEGYPGIGMVGVIAIRHV VTECGAEP AFVMKIEDMPTAAIV  
HEGRVYPSAGVFVLDL SFFYAEQADMRPGV VQNISESVAELSREIGVECIVCLAGI  
50 RAPDLEDEPSLYYAATSDKAAELFEGIAEPLKGGTITGVSGPLLL EGSLRGLDAVCLL  
VETPGTYPD PKAASRVVEALNEALGLSVDVSKLEEEAERIAKAVEETVQRLREQQR  
MEEEEAEP TERM FV

- 5 <SEQ ID No.:0997;PRT;Methanopyrus kandleri>  
LKMLAITGVSFRVVEQLLTQGSTQIIVRSGNNLDAVRLQPGDLVFVTTVGKRELKK  
GVSGVATVRSVSVHEHVVTGGDEHFEREFVAARLILNRVSGSRVREYKDCGVG  
RRVEVDVEMESAVSEAY
- 10 <SEQ ID No.:0998;PRT;Methanopyrus kandleri>  
LVAYQQGGGLVAFKLFVYPPLTAVPPVLPQIKPGEDELSVVRTLALFVSDTMQYDVGA  
EPPEYVPPVLRRAFAELELRGRWRGACGTASYMFSYLCRLYGIPTRLVLIPTDTGT  
VVSGTGRERERFVLHAQVQVWHGRWMTVDPSVGLVGTSDRPVQGHRVRPDGT  
ELYTPGVKSYTVCTQGPLVFWDTLTGLVELIV
- 15 <SEQ ID No.:0999;PRT;Methanopyrus kandleri>  
VYYSSLAEAFERLERISSRKAKISLIAQFLRQCPEDVVDTVLFLANQVFPGWDPDRD  
LGIGSKLMRKVIATATGSTDSEVTELFKRLGDLGLTAEELLKRKTSTLLDSRPLMVG  
EVRETFEKIAEVEGEGAVKRKMLMMGLLARAKPKEARYLVRQALSELRTGVREST  
VEEAIAQAFGVSRKLVERAHMLSNDLGLVAKVAMTKGEEGLREIDLRPMRPIKPMLA  
QAARNVKEALAEVGGKGAVEIKLDGARVQVHSDGEEVRVYTRIEDVTHALPDIVE  
20 AVKDCVDADEFIAGEAVAINPETGKPRPFQELLHRIKRYDIEEVRKEIPVELHLFDC  
LYVDGESLVDTPFRERRRRLEEIVREREGEVMLVEQVITDDPKEAAEMFHRALEMG  
HEGVMVKDL DANYTPGVRGKKMLKVVPLETLDCCVIGGIWKGKGRKGLIGSYLLA  
VWDENKENLLEVGVGTGMDDETLERLT KMFEDLIVEESGREVRFKPEVFEVEFE  
DIQKSPKYSSGFALRFPRLVRV RDDLGPEADTIEKVRRIYEEVLQKH
- 25 <SEQ ID No.:1000;PRT;Methanopyrus kandleri>  
MVMVERVVQALPEMEPEDFKVLRALELEMRRHDWVPFDRLLERTGLDEKELGYRL  
SRLDRWDMVVRTRRQT VGYLGYQLRPEGYDALALRALVDQGVLEGLGPEIGVGKE  
ADVYLGISPKGAQLAVKFN RIGRTSYTKIKRYREYVKDKRHISWLYVNRLTAEREF  
ALLHLYPEGVSVPRPVAQNRHVLVMERFEGRELAETRVENPEAVLNRVLEEYEHAL  
30 EVGVVHGDLSQFNIVEGDDVLLIDWAHWVEVSHPSARELVERDVRNVCDYFRRK  
YGVHRHPREFFENSG
- 35 <SEQ ID No.:1001;PRT;Methanopyrus kandleri>  
MPIEIDMDSCLLCEACVAACPTGAIRREDGDMNHCIVCGACVKACPVD ALELEDLER  
EVDGEKVELKRIAWKPEECHKEDPPQCCEVCPQEIMRIEDGYPEL RGFVCMCLKC  
METCPIDAIGMKGVVEPKSEPPEHPEDEDVYVHPERCVGCTYCLQVCPTDAIEMVP  
TDAEFFKAEENEWSPVYVDPDTMELKQGRKVAKIDPEKCTGCTLCAQVCPWGAI  
AARDVPVQSREVKNEIDEDKCVGCGVCAEVC PGDLIEVDGVAKVPEKCPACKLCE  
40 RACPVD AISINVS YERSGEME
- 45 <SEQ ID No.:1002;PRT;Methanopyrus kandleri>  
LRVGTYLVDGTPRPAVFLDDEVHVDLPVLEFIEVVHSDGLGLDLDYSVYPLSEL RIG  
PPVPRPPKIICFGLNYREHVEELREMGMDVPSEPVMTMKAPTAVIGHLDTVKLPREA  
RRVDHELELAVVIGERC RKVSPEEARDAVLGFTIINDVTARDIEKREGQWVRKSYD  
TFAPLGPWIETELEPDGLEMELRVNGEVRQRATTDDMVRDPYELVSFTSRVMTLEP  
50 GDIIATGTPPGVGPMEPDDKIELEIERIGRLVHYVGQ
- <SEQ ID No.:1003;PRT;Methanopyrus kandleri>  
MDWVALDDTDSPAGGCTTHAAVLLRAELAEAGAEPVGRPLLVR LNPVNPVKTRGN  
AAVALPVEAPWSVDIEAVLRLAKKVRKGYPETRPGLV VCEGEPPRVCSVYEEA  
VRRILNPGRVKESVDDDVNVVLEGRGIVGAVAALGFARVRKDHEVT FEGIA YRAEK  
YWGTE RRVEESSIREFD RRTFPVTFDNLDSRDGDLITPNTPCPVLYGVRVSEPDV

LEVAPDMIKTREPVEYEIFESNQATDAHLVRVDRLADAEDYSNPVLDLTVVEEPRR  
IPGGHVVRCEDEEGVRVDIAAFRPARPLTEVVAALHPGDEIRVAGALRPETPKHPR  
TVNVEKLRVLRLEERVEVRNPVCGRCRRSMKSAGRKKGFKCSCGERAPEDSKIGV  
EVPRELVEGVTYEAPPVARRHLSKPEYLVLEGLLEPSPLSR

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<SEQ ID No.:1004;PRT;Methanopyrus kandleri>  
VVVGQKILASAVAHLPLFLVGAVGIYFILTASMKDDEHLRRLGFLIIVIGGPTSVLVSAI  
VGG

10

<SEQ ID No.:1005;PRT;Methanopyrus kandleri>  
VRAELCADLEEALRAGGHEVVRIERACFDIFVTRDGRAYIVKVLINADGLRREVAE  
ELRRISHFLEAVPVVVALKRHTGPLEKGVVYHRYEVPVLDPLTFARLVEGEPPKAVA  
DRGGQYVIRADEVDELDSRVRRRQLRREGGRITLARAEEADVEGVVELKTPEH  
VDTGRDRMTRFERRVAELLERMGAERTGKVRRAFPKLLAKDGETVLARAEEGGDR  
ESIALRDVASATGSMGVITRERCKDTYVPTIDIGTLEEIKDLEDLKEYLQERDPEER  
VRRLVEEAGITSPREIAQRTGIRESVIREFLRRMGITDERKV

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<SEQ ID No.:1006;PRT;Methanopyrus kandleri>  
MAMLAGDGRQVLILPEGYQRFVGRDAQRNMIMAARVVAETVRTTLGPMGMMDKML  
VDEMGDVVTNDGVTILEEMDIEHPAAKMVVEVAKTQEDEVGDGTTTAVVLAGELL  
HKAEDLLQQDIHPTVIARGYRMAVEKAEIEEIAEEIDPDDEETLKKIAKTAMTGKGV  
EKARDYLAELVVKAVKQVAEEEDGEIVIDTDHIKLEKKEGGGLEDTELVKGMVIDKE  
RVHPGMPRRVENAKIALLCNPIEVKETETDAEIRITDPEQLQAFIEEEERMLSEMVDK  
IAETGANVFCQKGIDDLAQHYLAKKILAVRRVKKSDMQKLARATGARVNTIDDL  
EEDLGEAEVVEEKKVAGDKMIFVEGCKDPKAVTILIRGGTEHVVDDEAERAIEDAIGV  
AALEDGKVVAGGGGAPEVEVARQLRDFADGVEGREQLAVEAFADALEIIPRTLAEN  
SGLDPIDVLVQLRAKHEDGQVTAGIDVYDGDVKDMLLEEGVVEPLRVKTQALASATE  
AAEMILRIDDVIAARELSKEEEEEEEEGGSSEF

25

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<SEQ ID No.:1007;PRT;Methanopyrus kandleri>  
VIALRVEDVLKAGVLITFVGIVLTALAILLAIKNASGRGEWGGVILIGPVPIVVGSSPK  
MALIVAVLALAMMLIMFLMWSAAKGFR

35

<SEQ ID No.:1008;PRT;Methanopyrus kandleri>  
VGLFEKYVSNLNRLLILTMVFAVICAGSTLALGVKKGIDLKGGTMVILKTEKDPDTVTS  
EASRILGVSDVEAIRSSQGDVIVQVPKYL SADDVNKLARAVGGEVESVQTIGPALGR  
VFWESVKVAVPLALVAVSIVVFAIFRKPLLSAAVLGALALDLVDALGLMALTGVPLTL  
ASFAGLLMIIGYAVDSNILLSMYTVKRRRVRRVDRAIADSFKTGITMVATTTAAACAL  
FLLSMSEAMFEIAAVVIFGLIADVLNTWIFNAWVIREKIAGR

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<SEQ ID No.:1009;PRT;Methanopyrus kandleri>  
LSGLGWMKENWRLLVITAVWIVAATSLAVKGVNLGLELKGGTMVIAKTDHPVSKKE  
MDQTVTVLESRLSTFGFKGIKIPVGRDHIIVMLPGTPPKEAVELITKPGRFEAKYKG  
KTVITGQDIESVESPRIERVEGGYQWSVPFRLTAEGARKFAEVAKNAPGQPIDMYLD  
NKKVSSPRISEDLAMAAASGHMEREIEIVGGAKTKEQAEREAKEIMAVLRSGQLPAK  
LVPEGVYSVSATLGQNFLKMAMIAGAIFAAVSVIIALRYRDIRISGPILFTGSSEVFL  
IGLASLTGFTIDL PALAGIILSIGSGVDDLIVITDEIVRGERRKEEVTLRQRIKRAFSVVL  
ASFATLAAAMAVLFVAGMGLLKGFAMTIAGAFYGVVITRPVYADLLKKILGTE

50

<SEQ ID No.:1010;PRT;Methanopyrus kandleri>  
VDVKLVSSILGTVVKAAVPLPLPLPISLLYGELDCIAPLLLTSLIMLVCGVALERIARV  
ERHVRPRHAIVAVPIIWLVIPLFTSLPYRFCEHMSWLDAYFESMSGWTTTGLTVLPDI

- DHAHRTILFWRSLQWVGGLGIVVSIISILRFETPSLLYVAEAREERIRPNVVNTAKE  
 MWKIYITITAVGFLALWAAGMNPFDALNHSMTAVATGGFSTRSESVTAWHSPTVELI  
 TVVLMVLGATSFVTHYRVAKTFRTPAELPKRIIKALRQYLQDRQFLTMIGLTAAVTA  
 YAGAVSGDRAWDVVRYGYQAVSAITCCGFSNADVLSFPEYAKLAITILMIVGGSTA  
 5 STAGAIKVLRLMAEAVKAAIARRTQPIRGVVVPRIGSRVLSSEDEISDAFAIASAYMF  
 FLLIGTLLLTAYGYPLVDALFEVASAQGGVGLSSGITAPNAPAFVKILLIFHMWIGRLE  
 VLPCLAALYWLTLILKRLAVKGRD
- <SEQ ID No.:1011;PRT;Methanopyrus kandleri>  
 10 MYVVVVGGGRVGRILAELIAHGHVWVIEKDKRRARELAQSELDVLVQGDATDL  
 DVLQDAEJETADVAAVTDKDEVNLAVSLIAKEEFGVERVVSRTDDRFDVFRRLG  
 VDAVVNPDRSAAQLIEKAITRHNLVDVIMFGRGEAELEFEVTEDSLVS GKKISEIPA  
 DCVIVAIYRDDELELPRGDMEINPGDRVLVLALRDKLKKVEKLFKGRDEGE
- <SEQ ID No.:1012;PRT;Methanopyrus kandleri>  
 15 VAIEPMREVFVFCLDEKVS DLLKRVQLEGCLHVEDFWEAHGVEKFYGVKRPEVPQE  
 LMKLTDVLT RLARIEESLRRIHEEVRSTGLLDALKPMFKAERPETVEFELKPTEEIVE  
 DANEFLEEESEAGEKLRNLKDELERLEEACSFLEYVEEDFNVSHLGEGPRVV  
 20 ARLYTVRADSWDDLQELDGEPAYVGKVGTEDEGDPIAVIAFPKSGSIESEIRRLGA  
 MEEEVVNEVLEDREGSVQSVREELAEIEEVKDELERTKHELAEFYEEERGTEIRAW  
 VELLENERELFDVLPKLAMTDRTYLIYGWVPEEEVGRFKEVVK EATDGLCEIVVHEP  
 SDLENMPVRLRNPRFIQPFETLVEMFSLPKPTEIDPTPIVAIFFPIYFGFILTDAAYGAI  
 LTALAAAIRMGAGRVDESIRKFSEILLYAGIVTIILGALTGGYFGNLLGIKPLWVDPMK  
 25 DPITILIVALGFGVLHVIGLMLGMYVSLRKQRDMRSFMLDYLCWFLILLGGLLAVA  
 YKTGGIYTPLGYAGIAIAGLGFVLVLAGHKLLGVLDITIGFMDILSYRLLAGCLSTAG  
 IALVVNLLAKMVEGLGVVGYVIAGIILIGGHLFNMAMNGLGAFVHSLRLHYVEFFSKF  
 YEGGGKPFEPLELKGEHVEIRA
- <SEQ ID No.:1013;PRT;Methanopyrus kandleri>  
 30 MVSTELTIAAIGAGLAAGVAGVSGIGQGIAAAAAGAGAVA EDEATFGKAIVFSVLPET  
 QAIYGLLTAILIMVGIGLLGA AKAVTVGAALAALGAGLAVGLAGISGIGQGIAAASGIGA  
 VLKDEALFGRAIVYAVLPETQAIYGLLVAIIMVGSGLLGAGGKVSLGAGLAAMGAG  
 LAVGLAGTSGIGQGIAAASGIHGVLRKEELFGR LIVFSVLPETQAIYGLLTAILIANFVG  
 LLGGPTSVSVGAGLAAMGAGLAVGLAGTSGIGQGIAAASGIKSLIEEEGVFGRAIVFS  
 35 VLPETQAIYGLLVAILTLFSLKPDLSLAAGLAALGMGLAVGIAGTSGIGQGIAAASGIA  
 GVL RKEELFGR LIVFSVLPETQAIYGLLTAILAMFFLGAGKPTLAAGLA AVGAGLAVG  
 FGGTSGIGQGIAAASGIRAMIERAELFVRGMVLSVLPETRAIYGLLIAILALFMMKSGS  
 VGAGLALIGAGLAVGLVGVSGIGQGFTAATGAATLVKNEGFFGRAIIFSVLPETQAIY  
 GLLTAILIMMFAGILGGAGANIGLAGLA AVGAGLAVGLAGSSAIGQGIAAAGVGAS  
 40 AEKEELFGRSVVFSILPETQSIYGLLIGILLAVFAMKAGSPVGAGLAALGAGLAVGIAG  
 FSGIGQGIAAAGIGALKRDPGSFGRSLIFSILPETRSIYGLLVAILVMVGLGLMGGTF  
 SGNEAVGLAALGAGLAIGLAGLSGVGGQVTAATGISNVVKDPGMFGRSLLFSVFPE  
 TQAIYGLLIAILIMMFAGILGGSKSPALGVGLAALGAGI AVGMAGTSGIGQGISAAGA  
 RATAEDPGNFGRSIVFSILPETQSIYGLLAGILALTPVLTGAGAH LAAAGLIGIGAGL  
 45 AVGVAGTSGIGQGIAAAGGTGALAERTEMFARSLILSILPETRSIYGLLIAILSMSLTG  
 VLGAGKASLAVGFAAVAAGI AVGFAGLSGIGQGITAARGSASMVRREQVFGKSLV  
 FSVLPETQAIYGLLTAILIVFAALAAS
- <SEQ ID No.:1014;PRT;Methanopyrus kandleri>  
 50 MGVEELERKILED AEKEAEIEEAKRDAERIREKAEREAEEVRREILDRARREAETR  
 RRREIAQAKLEIRQERLRVKEEYIEKAIERAE EKIRELAE EGRKEYLEFLKRS AIEAVN

AISSDEVVLRANENDLMLLDEMLSEIRDETGKDVELGEPVEAVGGVIAESKDGSEAY  
DNTVDARLRRRRSEIVRRVSETLFGG

5 <SEQ ID No.:1015;PRT;Methanopyrus kandleri>  
LLGLAGLQDYTLAVGIIALVTVLSIILSIPITDVVWRYAPYAYPLPRAKAVEAETLSDE  
DYEELKDAPVRDLVTRLEELGVEPEAARAVLDGNTAPLEIELKRRAVESVMERIVET  
SPEDVSEALARALIAKYELEDIKAVLRARHAGEEPPKHLVDAPVLLGAETWRELKEARS  
VPEVVDYLRGTPYDRGLEEALREYEETGSLLPLELALDRAYYHLWDLVVSEKVE  
10 ELARLVGLEIDLNVNVEVALRGAILNLDPERVLEAMAEGGWELAEWRKRELAEADPL  
EVVERLSGTSLGPYLEEAAEEYSEGRGVQVFDEALRKARYELAREIAGSDLIGAPAV  
VHAVYEKQREVDNVISLVNAKVADVETMLV

15 <SEQ ID No.:1016;PRT;Methanopyrus kandleri>  
VYVVAADVNGSVASGFRLVGVRTIDADREDPKEAVKKLASDPEVGVILTEDVAEKV  
KEEVVEIQREKVSARGEATPIFVTVPGPEGPTEEFEIEEIVKKAVGVEIDLERIER

20 <SEQ ID No.:1017;PRT;Methanopyrus kandleri>  
VNSNVKGEIVKLAGPVVEAVGCEGAKMYEVFRVGDGLIGEVINIESDRATIQVYEET  
TGLQPGEPVKGTGELLSVELGPGLLTQIFDGIQRPLPEIRKEVGDFVERGILVSALDR  
KKKWEFTPKVKEGEKVEEGDVLGTVPETEFIEHKIMVPPGVSGEVIEIAADGEYTV  
DTIAVIEDEEGEEHEVTMMQEWVPRKPRPYKRKLDPEEPLITGQRVIDTFFPVAKGG  
TAAIPGPFSGKTVTQQQLAKWADAQVVYIGCGGERGNEMTEVLEDFPELEDPR  
GRPLMERTILVANTSNMPVAAREACIYTGITMAEYYRDMGYDVALMADSTSRWAEA  
LREISGRLEEMPGEEGYPAYLASRLAEFYERAGRVVCLGSDDRVGSVTVGVAVSPP  
25 GGDFSEPVTQNTLRIVKVFWDLSKLADRRHFPAINWLQSYSLYLDDEKWWHEEI  
GGDWRELRLDEAMEILQRESELEEIVQLVGPDALPESERLILEVARMIREDFLQQNAF  
HEVDTYCPPEKQYEMLKTIHFKERAEAEAVDKGVPVDEILKLDVIDDIARMKVIPNEE  
AKEKIQEIRKKIDEQFEELIEEAS

30 <SEQ ID No.:1018;PRT;Methanopyrus kandleri>  
VREFLVLFNHAPTSPDRVRLKDLPGSGRFDLVCRVTTQALLYSHGVRTDTVVHLL  
RGPDDPKTITVTGRRVRRLYPDERTTAIHLRRALEADPDTEPHPGIFVRRADLEDL  
LGEMKGAKLYLSEDGRDLEEVEPEPDAVFVLGDHEGPTPEQDRLLRRHADAVISL  
GPIPYHADQCIVILHRYLDVKRPPEYAHGPSNVM

35 <SEQ ID No.:1019;PRT;Methanopyrus kandleri>  
VAVVMEISFYPIGTGSPSVSDEIVEVVKALKEAGFEPQVGPMGTVVEVETFEDALEA  
LRVAREAAALRVVDRAVFVVKIDERRDKELTAEGKVSVERKIQE

40 <SEQ ID No.:1020;PRT;Methanopyrus kandleri>  
MLTVFLLALLISPVGCSGMKLGAVWISRESGYTHHLFLVDNASGALWYLGTDASPG  
PRPWVLERTLRKPEPLIPGEVHPDALGAVVIPFKPGEWPGVALCSDPTTAATFRRL  
DRPELRTILNGPVIVTTEVQGRPCCVRRTPDGFEFEDGTDADYNDVIEVTLEAV  
VSVGELKISIKRESPEEYDVLLDRSTGSVIRITPDGEASPIIGTLDVHPERLGIALKG  
45 EDTVLCSDAETAEVLRLKLAESPELRAFLDGAIHAWTTEVVGRRVDACRGSTKCEH  
GVWYLRFGFEDGWDGVVDYDDVIVEITGPRGNFNPLSVLPLILMPRGRNPWRS

50 <SEQ ID No.:1021;PRT;Methanopyrus kandleri>  
VTVLVSTLALGDWWADPERVNELPELTGSDGVLEILGSGFQPGRLDPNELNVEVSS  
VHAPFADLNPASPSDHHHEYILEVIQRAAEALAEALDAHYLTVHPGHLTPVTIHRELA  
IELAIETLGELADEVRSFGVEPLVENMPDHSLLLGTSADEMEEILRASGCGFTLDVG

HALTAEGSLRPYLRLRPDLLHVHDNSGDGDEHLPPGSGILDFEELRRALHHRVLPV  
VEVRGIEKAREAVRTVREIMERPEN

5 <SEQ ID No.:1022;PRT;Methanopyrus kandleri>  
LEGKDKPVDVGDVYEVKIEDTGKRGDGVARVNGFVIFVPEAEKGDKVLVKIVSVRD  
TYAIGRIVEI

10 <SEQ ID No.:1023;PRT;Methanopyrus kandleri>  
VSSEIVLEHDVLTALREGGLKTPRFTVLERPEEASDVPFDPPTYTVKLLHSGVAHRAR  
VGAIYTAVPSKERLERRVAELLERWPDAGVIVQEHLDVVKGIEAFLGIKEDDTFGTV  
VLLGLGGKLVEELRAYIVRRPPVDGEDVERGLRRVPGGERLLSEIGNRLAEVVNA  
AHGVYKEEGWSELVDNPLLLIDGEAIALDGLARKAD

15 <SEQ ID No.:1024;PRT;Methanopyrus kandleri>  
VGPVSADWIPDSPDELFRKIHSGEVIELGQNTNRLGPPEEVRRAVVRAALEAPYNV  
YAHPPQGDRLREGLLYFELDDDFDAVITNGAIEGVHAVIRAFASNGVAVTPDPGYK  
TIDGMMMAEGVHVQEVDIYSEEDYQMTVDVMEEFDGNLRELDLIFVINPSNPLG  
SSMSERELRGLVELAQDADAFLVHDCTYRDFAPEQPVACEMDPERCVDLYSFSKT  
20 YGLAGLRIGAVIGERKLLQVSKYKVSCLGINLIAQEAAITALKVRDRWIPRLLREVTR  
NQRLIKRECEGDGVKIPVYP SHANCLVIDFSEYGYIDSKTVVGKLYSEHGIFVRTGY  
TSPRRGKGFIRVAFSAPREDIERFCEAFNEVMGELIKS

25 <SEQ ID No.:1025;PRT;Methanopyrus kandleri>  
LCKYRKVLGVSRSLSGRARDILELVNNSGITVSEISRRLGLHRSTLDYVKILKDL  
GLVETKPGRGGGVYPTKDAVLLVRSGGRVTIVRRGGGRARILIEAEDRPGLLADVT  
NRLASAGVNILETELKVEEGIAIMEFEAENVVHEEVLQELDGLSGLIRVEVEPRGRK

30 <SEQ ID No.:1026;PRT;Methanopyrus kandleri>  
LPLTPAEALLEILGTANVLVPRSYKPGKATGRAAVNRFALYAVRKGLGFEEVERPVR  
VYTSWRGLSLAVPGEETTSYRATPRGRDVPPEELAEAVPDYPARPHFVVDYRFW  
GEHSDFGRTNLIRQTAVTASTLRLYLSDRMSLVNVTPEAEERFLNAFSPFEGGLYE  
DWEDLIAELSVDRVILLDPNAEEELDENEIREDAVFVLGGIVDENMRGWTAKLAPGIP  
CDVERRRITLRGSIIGVPDRINALVEALS R VIVEGESLERAILRVQSPRFARRRLSREL  
RRDLRLTEELRRLREVVNLPKREILLEARRRGIELKVDLQDG

35 <SEQ ID No.:1027;PRT;Methanopyrus kandleri>  
MAELGYEKAERCEVGEKPACKVGLRDGKRLIHDAHLRPEHYYSVYQSCCNWECL  
FCHSWRFTQRPVGTWWSPEDFVRHALEYRETVTVWEPRSRATSFHATDLCLGCG  
RCVTLGERPEWCPGELDPDQVVPSPQGWGPARNIVAFTGGDIACRPEFYVESIRG  
40 LKSETDDLWVLETNGFGLVRENVEELVAAGLDAVWLDVKAWKEDVHRKLTGATN  
RYTLKAIELLVEHDVLEVCTLYIPGYVEADQILRIAKYVADIDRNIPFTILAYFPEYKLS  
VRPPKRSELETAERLAREVAGLKNVKIGNEGVALPG

45 <SEQ ID No.:1028;PRT;Methanopyrus kandleri>  
MWGCSKGLSESEIRCPCICNGKYPAPALTVDGIVPYRGGIVLIRRGKKPFKGKLALP  
GGFVECGETVEEAVAREVREETGLKVRPVELVGVYSDPGRDPRGHVSVCFRCEV  
VGGELRAGSDAADVKVVDPSDLTPDDLAFDHYDMLRDAGIVR

50 <SEQ ID No.:1029;PRT;Methanopyrus kandleri>  
LKRGKIAAYVAGGLLLCTVSANALLGMREPPRFAEIDNPSLGDRVFLAISGLVVGIM  
GVS RGIWELRNVERVRAALGLLKKAERYLEEGSERIPAKYNAVTYALRALRCVKNA



VEILEEMEEELSESQERELKEKAKEKEKAEKEGEEEEKVEKRGSSDVRTAERRDGAGD  
ENSDDRRSRGDDGTADRGRRREEDRGVSDGGGSEGS

5 <SEQ ID No.:1030;PRT;Methanopyrus kandleri>  
LVEFRAYQEEARYFKYAFNAAGKVVEEAPLIVTENGIVSRAMDASHIAMAVLEMPW  
EMFDEYEPPSDELMYGLDMEEVTRIVRRARVTDEITLEGEDDEEEVIKLGSSGYERE  
FRLRSIDIDDIPDEPELDFAVEVTVVPDFIQDAVRDADLVSDTVKVGAKGNTFYFKAE  
GERGRVIPKVQEGAEALLTFEVEEDVETAYPLDYLKDMIQAAQGAESVRIRLGQDM  
PLELTFRIGPAGEGKLTFFYLAPRVEE

10 <SEQ ID No.:1031;PRT;Methanopyrus kandleri>  
MGWSALNVKRAWRKVRELRGWKAIFYVVLGVALGYGLRYGLGFVLGTPDPVVT  
VISESMYPYNNVGDVLLVGVVPYRDIKVGDVIVYRLPGKPIPVHRVIAKTPEGVITK  
GDNNPLPDPWCPIRPKEISGRVVLRIPIVGYPKALLDRYLYGG

15 <SEQ ID No.:1032;PRT;Methanopyrus kandleri>  
VVEEDVVEITSRYLRRDPDKIAEIKYKAGIETLSDLAATDPATISDAFGVKESTAKKIID  
AREEASKGIMEAKTLADLLEEEKKRDVIPTGIQGFDERMGGGLPTGVIVGMYGPPG  
AGKSQFATQVAHALKEGESVLYIDTENAFRPPQRLLEIGGFKKDELKEVSDRFVLR  
20 IIDAAALRQYFDEKEGEFISEAYELTPKVVIDSISQPFPRYSARDKLPERSRMIAHILN  
TLLKYCTAYNALGMVTTHVQANPDAGKRWQDVAPTVLKHATYRFSIDYKGRTER  
VITLEDAPDKPPFEVQVELTDRGLVG

25 <SEQ ID No.:1033;PRT;Methanopyrus kandleri>  
VDRELVMRFLGTGGAVPSKDRSHPGLLVEFSGTKLLIDCGEGTQRRAMEQGVTHD  
VDAVLLTHHHVDHVAGLLPLATTVDLLHGRRLKVYGPATGESALDISDLEVIEYREV  
NPGDEVEIGDLRVLVYESEHGVPVTDYRIETPKIPGKADPKYIRRVPPSKRREVL  
GERPYSLTGPKISVYVKGDRPADPENVRGCQVLVHEACFEDHEEAVRYLHSTH  
LEAAEVAREAGVDLLVLTSLTKVDPERMREEAREVFPVVVWARDGLMVRVRR

30 <SEQ ID No.:1034;PRT;Methanopyrus kandleri>  
VEAVVLFAPGRDVIVGGGNLFEASRRLYERALSDPSALGEASFPTLDIIRFVLYEE  
GYDPREITLISLGTTRLDHQYGHHPEDTEYCARLVSLYAEKEWGVRVEDPVLRKD  
PDRFEVFREIEDVLKTLHRREDLKRSELYAYVGGAHNVGWAIRLIGATLWEDRFHP  
35 LRVLDENVEVEPSPLILPMKTMKCVLIEHGLFEVAAGIAERFSAYEDRMEPVYLRAR  
DSELNFNVEEARRLYAEVTRSAHLDELREARRRLRLKREAEKDPIRRIIHHMRVVL  
ENARYQWIRGEFGDFIVRLSMLYENYTQACFMLLYERLSGERVTTSDPVELASLLA  
DLLGSSEELSGAVEDRLDSDIEAVLRELRGEEGEGRAVLAFHVAQKVLSGALEVG  
AVEKDVFGPLSRYIQVLSCELRKARHLFAHEGRGVSRREDVERIVKAMARPCRVNF  
40 ETIDELLSFLEEGIDRLELAVSEVRGTDGRG

<SEQ ID No.:1035;PRT;Methanopyrus kandleri>  
VTEGFALPDDVQRVVYSRFDPTPPQRVAIPEIMDGKNVLVIAPTSSGKTETAVLP  
VFSMVRELDEPGIKALYITPLRALNRDILRRIRWWGEKLGLEVAVRHGDTQPSEERRR  
45 QAEDPPDVLVTTPETLQAILPGKRMREHLSHVRHVIVDEVNELALDKRGVQLTLGLE  
RLAEVAGDFQRIGLSAAVGSPDRVGKFLVGDRDVEVLEIEAERYLDVSVAHPTGPH  
EVKERLELIHELAKERDSVLVFTNTRQMAELLATRLKTEYDDIEVEIHSSISREKRM  
EVEKRFFKGEIDVLVCTSSLELGIDIGHVDLVVQYGSPPQVTRLVQRVGRAGRRRK  
RAEGLVITSNPDDLAEAAVICRRALKGSLEPTEIPEGCLDVLHQLVGLCLDGHQVT  
50 VDYALEVFRRAYPYRHLDATLREVAEFLDDIEVLRVRGDRVYRTKDAWKYYYSNL  
SMIPDERHYRVVTESGGHVSVDLPFVLEYLRPGIKFICAGRPWIVQDQVDHRYEVL  
VTPAEAVEGAIPSWVGEEIPVPEVAREVGEIGRAEAALEDGFTEAVEVAAETFG

GRREAKVLADLIRRQREHSAPLPERPVEDLGGTLVIHVYGGTNPNTLEKVLGTLI  
SGRLGTTVRTYSTPYKIVISAEKRAGLDADLLMECLETLPSEDERGFHALTLRIVEKSE  
VFKRRLVHVLKRFGAIEPDADYRDVSPRRLLKAFKGTTPPYETVSEVERDLDTSVAF  
RLVKELEEKAEIVRVRDPSPFAEHVLEGLGEVGRVTSGLLAAQVETLKRDLERRKL  
5 WLGCPCGWRGRRSVKTVKEEGLECPDCGATYLVAAKTEEGLEKLLKDSERARR  
VADLLESYGAKALEALAVPGVGPEAAAKVLRSTGGREPHFYRELLQERLRYLRTRR  
FWD

<SEQ ID No.:1036;PRT;Methanopyrus kandleri>  
10 LPALVLIHIAVSIAHTPAHGRVGGFVSGHYLDPEFDAPNTSFGSDIDGDGRVDRIWC  
AEACAVDMYNLGVAMGWWNGDPVTPLQYEISATGEHDDNDIIDAFAQAIAGSDAA  
SKVFEVAVVSLNRPVSYPHVLVLGAVQEGSRRYFVVDDESTSDVGELLVPYDLFL  
SNLHPGILEFFGPVEVNRLYSVLSGAISPLTVIVSSKRGRTLTVLLTDLPGDSLAAF  
TEELWKAALGYPVAVAVSKPFLDLGGVTRIRCDAPVTGDVETRRPLNGVESGEGP  
15 SPPLGIPIFIGTVGIAGLFFLLLTFLGLSYLPV

<SEQ ID No.:1037;PRT;Methanopyrus kandleri>  
20 VFNVDPSDLVTEGVPKTPVMKATVLAVLRPRPGERILEIGAGSGSLTLELARAV  
GPLGRVYAVEGDKEAFRSLERNVRDFCLEDRIEIVRGWAPEALEDVDEDAVVSG  
SERLEEVLLALAERVRRRAILLNAVTPETFATAVKALDGWRRSCLCMVWGEGKVLRR  
GTLFSGMRTSYLALFEPER

<SEQ ID No.:1038;PRT;Methanopyrus kandleri>  
25 LNTGAPTLYGVGLGPGDPDLLTRKAIRIIKKVPVAMVPFVGAESRAARVVRAVDPEA  
TVVGYHAPMTRDPEERDRAYSKAAETLAELLERFHEVAVCNLGDPTLYATFWHIVE  
RIPLEDFEIELVPGIPAGLLCAARIGRPLAMESDKVLICTREPPEDLEGMDTVILYKPT  
RRGVERLLREGFEVYACRELGFEGERVERVNGAEFEPSTYCTIVALRP

<SEQ ID No.:1039;PRT;Methanopyrus kandleri>  
30 LLRTVWVDYARKGEPDVILVGRREDGNPAALVVKGFRPYFYAEVEDGFDPSEVERL  
SGVVEVEEVLLHPYGGDRVELLRIVATYPKVVPKLREQVKKLDGVKEVYEADIPFV  
RRAAVDLNLPPASEVDVSDLDTGWSGLPAYFADVEDARELDHRPYPIEDLVVASF  
DLEVLAEPGTTIKGASGPIIAISFAYSTPDGERNNYVITWKGEDESFEVDGVETEIV  
CRSEAAALRRFFDEFRRVDPDVFTYNGDEFDLPYLQHRAGKLGIDVSPLARPAGK  
35 RGIILKHGGGRYASDIFGRAHVDLYHTARKNLKLERFTLEEAVKDVLGVEKEEMELA  
DINEAWKRGNDLMRYSAEDAHYTLGLELAQVELELSYLTRLPLPDATRFSGGQ  
LAEWRAIYKARQEDILVPNKPTRDEYKRRRRKAYKGAIVFEPEIGLHENVVCVDFAS  
LYPNVMVAHNISPDTFDCDCCPRTVEEVDPTDATVAPDVGHKFKRRKGFFPRL  
VEGLIERRRELKRRRLKLDTESHPHEAKILDVRQQAYKVLANSYYGYMGWANARW  
40 FCRECAESVTAWGRYYISEVRRIAEEKYGLKVYVYGDTSFLVKLPDADLEETIERVK  
EFLKEVNGRLPVELELEDAYKRILFVTKKYYAGYTEDGKIVTKGLEVVRDWAIPAR  
ETQRRVLKRILADNDPEAALKEIHEVLERLKSQGDVDIDELAVTSQLTKKPSEYVQKGP  
HVRAALRLARHLGVEPEPGTIVRYVIVRGPVSDKAYPVELVREEGKEPDVDYYIE  
HQILPAVERIMRAIGYSRGQIVGETASQKTLQDQFFG

45 <SEQ ID No.:1040;PRT;Methanopyrus kandleri>  
LRVAILDGYTDEPAGLGVPYLGTHPRYAYGAARAAGATEVRYVPVERVRSGDVL  
NRFDVVVGICGVHTPGKYLARPADLSEMLRILSEVDAVTVLGGPAAQSGHGRVG  
GELPETEVEGVDVIARGDVEAVVYDLVSEGSPEAVDPDRRSIEELREYSVKGAPA  
50 AREHVDYPDAVIAELETYRGCPFLSGGCSFCTEVPYRGEPEFRPPEDVVEEVKAL  
YKVGVRFRVGRQPCVFSYMAEGIGETERPRPNPEAVEKLFGRGICTVAPDLVTLHV  
DNANPAVIAEHPVESREIAKVLVRYGTPGNVVAFGVETFDERVARKNNLNVESKEE

VFRAIEVVASVGGYRGWNGMPYLLPGLNFVCGLIGENRERYRRDEEVLRELVERGL  
 RVRRIINVRNVVFPFGTEMGEHGTWLERNRERVAAFKRFRVREEVDPVLLRRVLPK  
 GTVLRRLRVEPREPEFARQVGSYPVACRLLAEREPEGEWVDGLVVGHGARSVEVIP  
 LPVRREDGPDVLAKLPGVGKKEALDAFLKGRRPRVPYALRSWFAF

5 <SEQ ID No.:1041;PRT;Methanopyrus kandleri>  
 LPWTIIDALAEALASTKRVVVATSDPERALVIRGRPVKAKVAVAAHIWLCCLTAGDT  
 RALVTFLWLADPSFPTDAVEPPRTIVRTALSAYIPGTGWIGGIPHFDTASFRDWLR  
 RLARGETEGTVVLFGRQKLPSWAVDVLRGMDLSAFASRLPNDLVVLAHGIDAVG  
 10 PRRDAVLRLEALDDVTSRYGVRTVAVFCESSFVKPVEVLSGLERQHKRVEALISVR  
 AFTLNFPKPAEYVIRLNTPIQVVPFTGDASMGLGEYATNRAGPSLEWTVQVQL  
 GSEREGSFYRVLWLNGKDDEPVLLPGTLDDLGRLLVDHILRLRLPDREKRVALV  
 YCYPGGAELGAAYLDVPRSLARILARLAGEGFDLGPGEFFRELYRAYREDPREA  
 RTLEDVFVAVFNAMSSAVDPHDPRRSVLLANVGPWAKGELRRMFDLYEGGYGE  
 15 WSLNVDGREVEIEVRDGVTVSVDGRSFVLCSSISRDQLIPAENVREWFEEVDVRL  
 HAYLDLVRELDPEAVRAAVEGMIEGFRRTWGDVTDNRGIMTDGRRYLVPALRFGN  
 VAVVLQPVRGWSGSPEAVYHSRELPPHWQYIAAYEWLRRVVFHADAVVYVGTHTGF  
 EFLPGHDRGLTVTDWTHLLLPDVPQAYFYVSNPGEGLAKYRGGAVALITYSPSPSG  
 YFKDFRKYAELERLWSQYVSSSIYGGDPAVRKVIAEKILKKARELGILEDVKSIFAE  
 20 RGESPPEDPESWAERHLEEFDLALHDYLLALRDEKSFYGLHVIGEDLPVELAVEEAA  
 LLFAPRFAPYLAVTTGLTPKADLELFRRLADENPDFYQDVKIRTYELLRSMLEIWN  
 PYLRSVLLQWVELKDEGELRDDASLLSKADTILQRFKLNLLGLYRQSLLKIGLWEVT  
 NQYDQDIKILIAEAFREFVHVYESGEYELDNLVNFLRGGHVPTGGFGEPLWNPKEY  
 PTGRNGVPFDPYTLPTPEAWEVAKRLMDDFLARYYRVYGRWPETVPIVLFASHELT  
 25 SGGGLIAQVLYLLGVKPWWDPNVSGKVLGVELIPLDELKVKGNRWINRPRIDVVALC  
 TAVLDSIEPVVQLLAAAFRLASDAEEPLAYNHRRKHYLELLKLGVPPLAATGVFGE  
 PPGDIQGTGVNRLVELGWSELTKGLGIDGAGTVDAFSEKIAEIFESRVAYAFTVTG  
 NPNGSKLLREELTGEEAAVKAVKVFYRLASTVDAVIDQVNAFNVIDVNDYYSWIGG  
 MVTYVRLIRKKEPLVFLTVARDPHTAHVQTLAERLAIEVTELLSPSWWEALMAHGP  
 30 DVGWHEVMKRVQNIQVIAVTTTQVRPMVQTLTEVASTILSALERYRSTPKGWAE  
 VQSTLSWLVEAVRVGLWKPDRLTKALVRAWAEVTARYGPSTCHHTSLNPSTVPF  
 VRNLAASLGLNDVLKMLPDIVRAYRTLDNPKVVAEMIRMIVTRSRASYRAVEPRSVS  
 PRSLRAVEFVESPRANNLEVGNLPSGSVSRASELVSTTGVIHGRLPVGGAIISTGGT  
 35 SGSGCRAVPLKSEAAKESEARAMVRESAPAPRVIWEWVVGLLAASMIVVLWARRQ  
 FRRWNW

<SEQ ID No.:1042;PRT;Methanopyrus kandleri>  
 LSTTLPNAEEVGRELGIPVHVHRIPKDPTSIGNLDWDGISRSDVRSADVLIQRMGT  
 VPTAFTRELSRRTLGTALDDN

40 <SEQ ID No.:1043;PRT;Methanopyrus kandleri>  
 VRFYFAVDKARERGVPIKEFKLIQEDGSVYWEGKFGRSKWETSSEVIYGNMVALSG  
 IYLGLLSGEVKPKTWPEPERSRFEKGITVGLARILSLQQEDGGWGWKVVLVEGKTR  
 FPAGKGHVLYTAKILAKVLIPALRLNIKNSYGGTTYDVAEHARAARFLIDQQLESG  
 45 GYSANKESMTEDPLYTAWALRALCEAYRYRDLLGLDDATVQQVKEAIRRAVDWL  
 LSHQEDEGDYAGLWEMKSAAIMGSAYAPPSEAQIVRALIQAYSISEELGLNKAEKE  
 A

<SEQ ID No.:1044;PRT;Methanopyrus kandleri>  
 50 VDALKYQDASLVEFDGRKVLGWAYSSTRLESCGPYLGYTALIAATLKLAEGLGLG  
 SKAVEKMRSVGVTLEDEAEWVAHEWQEIDGLGYFLYPNSKAHKTVPSSQLYGL  
 TCAVAFSHPEVLLKRTTADVWKLVPKKGAWKVPVWPVTVVLLFACRRR

- <SEQ ID No.:1045;PRT;Methanopyrus kandleri>  
VRFPALVIGLLVALGPTAASESPKVAVVMPYHGSYDPHWIYMAHELPEKVQEILSVT  
YDEYNIQVYPGSFETYDVTKVRLQGGKEYVIHQEEVNTGEEVLKTELGHALKEAEF  
5 TNSGRDGLIVVLPFAFVNRGGQHQCVEIPEVIDIILGDKVPKYSVHYEPFGITNWDRO  
NDIGIVPELLFRNIQTEAEKTLTGPNQGQDPEDVFSAYKDKRLDFLVDHKDEVGLL  
EIMFGTLRVGYWDDFKANAMYVLRGVAERLGNLLGTTIPVGEVDWALENPFVREG  
KAYFFAFQNPEIGPENWEKSWEVRYEQFQKLMQSLCRQGVRYVAFPYITVTGIT  
10 DRKLFEGNPEHGPEGDEPEAYDYPEAILRHFGAELVAETVADVRKYTYVQEGQEK  
RTVYINARIYRIPKEKLGTDADMYVIYVRRGLLDAPNATEKVARVYANYIATHLPTWL  
MEYEAVKGMKEGFEGEINSLRKDVKSLKKRKVAVYPAVIALALAMIPPLRRR
- <SEQ ID No.:1046;PRT;Methanopyrus kandleri>  
MAVMDAEARSQGLPLAELLGGEPRTVESACSVHELKGKHALREARDNLSVGYTVV  
15 RVRADSAGLSSVSALDFETVLLLEFTDRPSERALEEVRVSVD AEIVVISPEEFDAEVP  
YVRVTSEEDIHGLGSAEGVALSVQEVGFLDAVLLGRKARELGFKIIVL TEVESAVSVK  
AAHLAGALRAEYCDLSGHLALYEDLES LGYAPEVELTGP GREVRVNHDPYELAEA  
P
- <SEQ ID No.:1047;PRT;Methanopyrus kandleri>  
20 LKRIVVVGAGSAGRSVARLLNHVG YD VVINDIRDWEDFTTEEREYLEVLEREGVEVA  
LGGHDREL FESADAA FVSPAIPEDA EGRKLAELVPEEITVEDVAGLLGDLFPVPAIGI  
TGTNGKTTTTWAVAHLEACGYE VWRCSLDRHLVIEAIVDGVVTGEIEGYDVA VV  
ELPHGTIRLAAGIELDVGVLTNVSPEHLDEF GGSFERYVRRKLTITEMSEVLVAGYD  
25 CEELRKRLND AVWYSVRDPADY YGRRENGRLVVKGP DASVEADFH LIGYYVENC  
TGAVAACLEFGADPEGVAEGLATFEGVPGRMELLGEFSGRVAYIDAAHNPDGLKAS  
LPPFRELADERGGRLLSVDNPDVTTERDKFEFG RIVGEYADFVAASGYNETLERL  
DRSAAEEVVKGAE SAGCEGVA VDSVREAAEEVAARSEEGDVLLHVGPGVVNAYDR  
VKRAFLRGLTSVLGEPSDEA  
30
- <SEQ ID No.:1048;PRT;Methanopyrus kandleri>  
MKHEIVRQALIYACEEMGALLRRSAFSPNIREREDFSCAIYDADGELIAQAEHIPVHL  
GSMRWAVQAVLDEFGSSEMPEGDAFLNDPYAGGTHLPDLTVVAPAFHDEL VAF  
AAVRAHHADVGGKVPGSMPHDAEDVYSEGLRIPPIKVAEDGEPRDDVLRLL EANSR  
35 GGEERRYDLTAQIAAAFRGCRQVRRIDEHGREAWERACEWCKDYAERRMRVAIE  
RIPDGEYSGEDYLEGDGISED PVRSISVTVRVEGDEVTVDFGTGTDEQTRGPVNAPLP  
VTYSAVFFALKALDPETPVSEGTYRPIEVIAPRGTVVNPEPPAPVCAGNVETSQRIV  
DAILDALREAIPLPAHSHGSMNNVAIGGVGFAYYETVGGGAGASPCDCGESAVHV  
YMTNTANTPVEHVEREYPIRILEHTVRRGSGGEGKYRGGDGIIKRYLALERCRTVI  
40 GDRTMHPPRGVDGGKPGKTSEYEVE RSNGKVERLGP KDSTVLEPGDMLIVRTAG  
GGGYGKGE
- <SEQ ID No.:1049;PRT;Methanopyrus kandleri>  
MEISEFQRLMDELYGEKDRKGPRTLLWLVEEVGELAEAVRKND RQAVREELAD  
45 VVAWTFSLANVLGIDVEEV LKEKYPGRCPKC GEIPCRNE
- <SEQ ID No.:1050;PRT;Methanopyrus kandleri>  
VKDGVLTAEAGLVGRDLELLSPITIEIEDGRVRRIEEGREPGADDDFDVVLPA PFNAH  
VHAADWAFRHAGLGMPLKVVAPPDGLKHRLLKVGERELEVSIRD FLETSLSFGC  
50 PGVADFREGGVEGLKLGLRAAEGFPTYVPMGRPKALDDPERVEEELRVLS ETEFV  
GIPDVHLPPDDVLEAVRDSGLRVYVHANENWRSVRECVREHGATEIERAVD LLEPEG  
IVHCVVLTDRDRELLEELDPVILCPRSNDYYRLGNPDPRRLRGLRVLLGTDNGMSV

EPDPWAEAYHAWIRTGLSPLGALRALTVEAASVFDLPILEEGRRLSAVGLKGLPLPE  
TVLGSQRQLAAHVLQLIKTSRVHVLLGAES

5 <SEQ ID No.:1051;PRT;Methanopyrus kandleri>  
LTRYVLLDGSEASFEALEHALEEADEVIGVYLIDCRAFKGLNEDMARALEEFMRQE  
AELIRETVEKRGAEFEIVRGEGPEAVMEYAREVGADAVVGVGHIPRFEDITFRRI  
EGHVRDVPVVLVPSR

10 <SEQ ID No.:1052;PRT;Methanopyrus kandleri>  
MCCAPTVPENRTGVRDVSEADAFDMACRELVEKMLSSEIRTKGELQEAKREVCRK  
YGLSKFPTDADVLERATPEEREKLEIVVKKPVRSSISGVAVVAVMTKPYPCPHGRCA  
YCPGGPEKGV PQSYTGKEPAGRRAKEHEFHPRKQVEARIRQLEISGHPTDKIELIV  
MGGTFPATPLCYQEWVRECLNAMTGKDALTIEEAQKYAETSERRPVGITFETRPD  
YCKEEHVDHMLKLGATRVEVGVQTIYDFILKRVDRGHTVKDTVEATRILKDAGLKVC  
15 YHIMPGLPGSNPERDLRLKRLFKDPRFKPDMLKIYPCMVFEEDTPLYDAWKRG EYE  
PYDEETAVKVIAEAKHRYVPEYCRIMRVQRDIPAHLAAAGIRKTNLRQLVHDYLEEK  
GWECRCIRC REAGHRMRQGV EVDPGRAELRIKERTWKGGMDYFLAYEDPEADAI  
LGYLRLRKPTELAHRPEIDPETAIVRELKVVGPTVPIGERDTDAVQHRGLGERLMRK  
AEELAASELDADKIIVISAIGTREYYRKLGYERVGPYMGKDLT

20 <SEQ ID No.:1053;PRT;Methanopyrus kandleri>  
LPKIPVGLGYKLAYKGAKLGLWKWGTTAKTGFFSLIHSLIFGPLGVAIVATL FHEL  
HYLACKLLDVPASPPVFLPLGGAFVQHGWTDPDKEVFIAAAGPFGGALAGIPLLVIY  
PKAAVWNGLIQLFNLLPIPLDGSKVLRLGLWMPSPATAWIGVATAVLAAALSLVGILM  
25 GLHA

<SEQ ID No.:1054;PRT;Methanopyrus kandleri>  
VSPRPYGGFRFSRRSCGSRGGSEAMEVTELEGLTISWDARPLAPDSVYGEDYMRI  
YRNVAGLLKIVQKAFDEPKGDLAIGFSGGKDSFTCALALEPFLREWDVNPKLVTVDV  
30 RVRGVEVWRPYRKELDRMAKALGYEFELVRAEEDVAEPSEELNKPPCKICSAIRRR  
ILAERHDVVYGHATAEDAIETLLMSVNRRRDAGTFPPADLLEDDALLRPLYVSEL  
RTARVYHEVTSRLGLPKVEPECPYAKRYRNSDSPRTASELVERLREIARVRDELA  
VENLARGLARMALADVLCGRGRLEMPSS

35 <SEQ ID No.:1055;PRT;Methanopyrus kandleri>  
LALVYHEEYLRHEQHPTHPERRERLSYTVDRFEEEGLEIEGIDLVEPDVPDREVIEL  
VHDPEHVELIRRMSESGGGMIDLDTAVAPETYDQALLAAGGSVLAVELVVRGEYDT  
AFAMVRPPGHHAGRAKAAGFCYFNNAIAAEYAIRELGVDSVAILDWDAAHGDGTQ  
EIFYDRDDVLYVSIHQDGRITLYPGTGFPYEAGEGPGEGYTVNIPVLPRSGDRITYRE  
40 AFQRIVEPVVREFDPDLILISAGQDCHFTDPITDLAVTAEGYRWMQMQRATELAEDLG  
ASGPVAVLEGGYSVEDGLPYTNLGVVCGMAGVPADLREPMQPQENPRGPEGVR  
KVAREHSRYWTSVKA

45 <SEQ ID No.:1056;PRT;Methanopyrus kandleri>  
LRFRTAILSLFALTAVMAYGALHLNVEVDQTKYLPDRFESMKWQHVVVERELGTSTK  
TLLIVIEADDVTRKPVLDYMRRIEDRLRSKPYVENVRGAPDVLRESPANFPAAVTMP  
GLRPLMSEMERSEKEMFVSKDHKVAIRVGLKSDADYRKVVPDVRSLERDKPKSVK  
FADVTGSPAINYDFYRGFLKDLVTALVSAVAALVYVDFRRWWAPVLGLTILSAV  
AWVLGIMYWLGFAPFYATVLLTVLMLGVGIDYVIFTLTRFQEEYDIKGRAKGEAILT  
50 AVRRAGRAVLITGLTASAGFAALALSEFRMVSEIGLGIVAGILTAVALTLLVLPSSLQSI  
PIGRKSSEKKEESWKVLSIPVRHPVPAIVALLAITGLLGYGAAGVKPEVNIEKFLGHN  
LPSLKARDVLEKHMDVSHHFATIVVEARDVRDPKVVRFMELKLRDAKRTGVAARVF

- 5 GAPDVIGMEKTVERLPAPIRSALEPKVEDMEKGVISGDGKVAVIQVQLKPGDPKVQ  
GRKILDMVRHEHPPTGVKVGVTGLPVAFAMHEQVNEDMRRSTIASAIGVLAIPTIA  
FRNPIPPVFGLVAIGSGILWAIGLLGGVLRIVPSFLAMQTTICILLGIGMDYCVFLASRY  
REERKEHGVKEAWHTMERAGPGVLFSGLTSAIGFLSLLLSTGIMRNMGLYQGIG  
VLSTLTLLVGVFPALYVVISRVFSRGR
- 10 <SEQ ID No.:1057;PRT;Methanopyrus kandleri>  
LSLVAARNPPDPRKLGSFKVRRCAACGRMLRIELSECNCVRCNDLRGEPLLEGPYI  
ENSGPYCDRCRGGVEPTSRLPEVAVAVCFLTDRRNHDLVLYRAAGALAEVVPRLRE  
ERRFVAVGTPVDDLYFNLRCGMEAGIDFGIRAQMSSIFTHMGPEYLVIAHNVPVKLR  
GRPRERFRYTLNESNIEELRRVIVLEDVVRNTDFKSVYRDLGREYPDVVFVASSGEVE  
KLVDALRK
- 15 <SEQ ID No.:1058;PRT;Methanopyrus kandleri>  
MIPTLTGRTDDPDRLMRGLEELGWTVREKGDRLVAISPGGQQVEANRETGELRITG  
RGEFTAARTLVKLAVKLGAEEVELEGLSSEDRRPLVYGPVPSRRLGTSLGIDLPRGM  
CTHDCEYCSVGVSRRVSPHERFTVDPVAVREELSETLRRCDPDAVTFAGVGEPTL  
CANLREIAEEIRPLVEGVGAEVVLLTNSTWVSECADVVDVAVASLDCAREDLYRTIN  
RPHPDMSLEHLVEELSQCDDPGDVVVEVLLCRVGKITNADPDHLRELADLLGSIGLER  
20 VQLNTVARPPARGRAEPVGRDELLVARRTLESCGLEVSVYR
- 25 <SEQ ID No.:1059;PRT;Methanopyrus kandleri>  
MQMLAERVLKWGPILVPALALIGLPGLRVILRSRVASEGEARAVVRRAGLYLGLASP  
CAGVAAAYTLVSGSVLLGRPELAAWTGPALILTPVTLLLSYVPGRSESMAMKMLVS  
SLTTSVPTTTAVWYALSYL
- 30 <SEQ ID No.:1060;PRT;Methanopyrus kandleri>  
LKIAITGTPGVGKTTVCEALRDLGFDVHNLNKVAREMDAILEEDEQRQAKVVDLHAL  
RRYVEEWEPESDPAFVESHYAHLMPDLDVIVLRLHPSELERLKEKGYPPEKIAENL  
EAEFVGVCYGEAVEVRSEGCFIRPPEDVIQVNVNVTGLSRAEAADRVLEAVNHRRGDD  
VDWLSDEEAQRTVERYLKYR
- 35 <SEQ ID No.:1061;PRT;Methanopyrus kandleri>  
VRRREVLRLREDDKYRHPAVLDEGVKIIIGDNLADVTAIEIGAYAEIGPSVWIRRKAAI  
YGFCRVFSDSDVGERASISPFISVRADVGNDAFIGDGSIMIGAIGEDRAKLG YDCFIGM  
RCVYGGVKVGDGAIVGAGSVVEEDVEPYTVVMGRPAEYVGDTVIRISANTFVGGE  
EASQAQRMVTRGYDTGWETLGCTESRGVNLTVVTFDREVWERLMGLLGRFRGEV  
DHGTFRFEGVEFFGIAASSERPPRRVVDKIRELLERAERLVACILDCPKGYGRDVV  
40 VRSGRISDERVTGPLRARGSRYYRTEEGLHTV
- 45 <SEQ ID No.:1062;PRT;Methanopyrus kandleri>  
LKVAVVAVQGAVEEHESILEAAGERIGEDVEVWVARYPEDLEDVDAVVIPGGESTTI  
GRLMERHDLVKPLLELAESDTPILGTACGMVILAREVVPQAHPGTEVEIEQPLLGLM  
DVRVVRNAFGRQRESFEVDIEIEGLEDRFRAVFIRAPAVDEVLSDDVKVLAEYGDYI  
VAVEQDHLLATAFHPELTDDPRLHAYFLEKV
- 50 <SEQ ID No.:1063;PRT;Methanopyrus kandleri>  
LACGIAGIVLPEPGPVGAILTEMLDALQHRGPDSAGYGLYRDVDTAVFVLELPAEDG  
EMELLSEVERALEGRQLKRVERIAEDAGTRVYRLFVEGFSTGRQGQRELAEVVEKI  
ENSDITVLSAGHGFEILKDVGTAAEVSEQYGVAEIEGTHGIGHVRFSTESEVDRYHA  
HPFQSYMIPNMAVVHNGQITNYTIRERLEIKGYQFKNNDSECIVVYVADKLDRDGY

SLEEAMEEAIRDLDDGPFCEIISTPDAIAVARDPLGLRPGVIGFGKDGAVAVASEEVAL  
RRIFGDELEGIEQIEPGEYEVFEVGGRG

<SEQ ID No.:1064;PRT;Methanopyrus kandleri>

5 LKERVIDCRDKEPRDINSALKTYAREYDRIVLENPGAKHYIAAGLTEEVEVIKGSVGY  
YVGTMIHGPRILVKG NAGWYPGDNVTKEIVIEGHAGDGVGQGM YGGTIVVRGDA  
GSRVQGIMKNGTVIVGGDVEIMTGM YMMGGTIIVLG DAGTYTGESMLRGEIYVLGE  
VEDLGKNAEAVDPNGEDIERVWELVRAYDFDVTRDDLKALT KIVPRSKRPFGSEE  
10 MEEG

<SEQ ID No.:1065;PRT;Methanopyrus kandleri>

VATTVVLCSGGLDSSVIAKWAVEELGGRVICLFVDY GQRNAPFERRAAERIAEAVG  
AEFETVGTFWLRRLCPDNPMFAGRLPREAGTEDLSANWLPARNWNLLGVAAALCD  
15 HLYLEGEDDEFHIVWGINAEAAERFPDNTKEFADAVAEALKRGLPSRRLHSPLAEL  
YKPGIVRLGSELGAPMELSVSCYNPIWEDDTPVHCGECEACYHRKRAFERAGIEDP  
TEYLE

<SEQ ID No.:1066;PRT;Methanopyrus kandleri>

20 VGLAGYLPVELCRFVRNPDPNTSGKRAEQLVRRYGPYLGVLTMVLFGSYITLATM  
AVAGLGDDRRAHLSALAGSMLLALLGYGATHHTLRALQPWLMGQEWGEELLRRFG  
IR

<SEQ ID No.:1067

25 MVVDKHARDAIRSGALSVFAPAVRRVRGRFRPGDVVKIETATGDFLGYAFAQTSR  
DVRSGRAPGIVARIFDRKGEYPERSPDEIVLERIERRYFRKRWKVDAHRDHMRV  
FSEADDVPGLILDKFNDAVFTTCAIERIILRNAAEELLEILDVDTLYEKNSRKRRL  
GMEVRKR VVAGEERVETVVEEYGVRFVAVNVEEGQKTGFYIDQVENRAKVQELVDG  
GRVLDVFTYVGGFAIHAAVGGAEVVGIDKFDRVVQAAAYRNADLNDVRDRVKFLVG  
DAFALLEKFERRGEEFDVVLDPPAFVTSKEHLNRGRRAYFDVNYKALGLVRDGG  
30 FVTCSCSHFLEPSDFVRLVNEAAARRSVRLRMLGPLRGQPPCHPIVPGNPDTRYLK  
AMFCAVEH

<SEQ ID No.:1068;PRT;Methanopyrus kandleri>

35 LKDDKGGRKLFVRNRHERYLAVAVPLLA VFLTTSPVMMNWDVHYFEEWYR  
VAMSKGLLHVYPECEKVHYPPMAVVFYITTRDLIHNGLDSNPWTFQFSKIFLVAFY  
LLTCLVIREFEWPIAQWGVISVPMGMVWGYQFDTIIAFFLALTAVCVRRGRPIAAG  
VSLALASSFKYVPGILVIPFTLILKEKYGSRPAKIFFLTSAITVALLWSPFILDPEAFWK  
QAFLFHMLRLPQDLTPLNIPLLLTRWHVYPYHFIIGKLSGPLIILGFVTALWLWKRRE  
ILQESIRTSGLKHTIWGSAALFMLWFALTTKVGNPYIAYIYLWVFPFAVWLLPSWC  
40 VGFLNTAPFLLALSRLPAAVCNAPVFPEDVRWYPALQLLGFSTPLAVEKAHQLYLA  
APNFMRLWYYHMHQTELVLVVYTVVTKTLLDLLKWIRDPKPADERPHDWAHPM  
LLAFTLPAYIFALYIALPIG

<SEQ ID No.:1069;PRT;Methanopyrus kandleri>

45 VSKVAVIGATGRVGSTAAARLALLDCVNEVTLIARPKSVDKLRGLRRDILDSLAAAQK  
DAEITIGCERDDYVDADVIMTAGIPRKPQTRDLTKDNAAIIKKYLEGVAEENPEAI  
VLVVTNPVDVLT YVALKVSGLPKNRVIGLGHLD SMRFKVLIAKHFNVHMSEVHTRII  
GEHGDMVPVISSTSVGGIPVTRMPGWEDFDVEEAVREVKEAGQRIIETWGGSQF  
GPAQAITNLVRTILQDERRVLTVSAYLDGEIDGIRDVCIGV PARLGREGVLEIVPIELE  
50 EDEMRAFRRSVKV VKEATREAMEAISER

<SEQ ID No.:1070;PRT;Methanopyrus kandleri>



- 5 VRLKRLSTNHLLSIADLDREDVETVLRVAERFKERYLAGERVIPILEGKTLGLIFEKPS  
TRTRVSFEVAMHQLGGQAFTYTKQELQLGRGEAIKDTAAVLSRYLDGVMIRARRHE  
DIEEFARYSEVPVINGLSDLHPCQALDTAFTIREKLGRGPHTVAFVGDGNNVCSSL  
ALVCATLGWDFVHAVPEGYECPDRVWREVERRAEESGSETRVVRDPKEAVREAD  
VVYTDVWVSMGDEAEREERLRVFRPYQVNEELMSHAPEHAIVMHCMPIQRGYELT  
DDVADSERSVIYDQAENRLHVQKAILALLMG
- 10 <SEQ ID No.:1071;PRT;Methanopyrus kandleri>  
MLKVLLVSGSGAREHAIAEALCGAPDEDVELYAFMGNRNPGIIRLAEDYVVGDPDPTDVE  
AVARAAADWNVDFAVVGPEPLAEGVADRLEEEGIPTFGPKRGPARI EWDKGFAR  
ELMEKYDIPGRPEFGIFEDPDEACDFIDELGKPVAVKPAGLTGGKGVKVVG DQLKNL  
DEAKEYVKEIFEEDIGGIPKVIIEEKCVGEEYTIQAYTDGEKVIPTPAVQDHPHAYEGD  
KGPITGGMGSYSCPDGLLPFITKEDYERSVEILERTVEAIKKETGEPYRGVLYGQFM  
LTAEGPVVIEFNCRYGDPEAMNILPIAEGDIVTLHASIAEGSMEGEIEFLEKATVCKYV  
15 VPEGYPESSEGE G DVIEVDEECIHYDAVPYYASVNLDEDGKIRMTSSRALAIVGIG  
DELEQAEEAAESAIRECVSGERIRHRSDIGKHETVEKRVRRMKRIRGE
- 20 <SEQ ID No.:1072;PRT;Methanopyrus kandleri>  
MVMNRERLAEMLLEVGALKFGDFVLSGKRSYYVDIKEACTHPKVLDALTDALLE  
VLPDGDVLAGPELGAVPLVSVLSVKAGLPMIAVRKRKKEYGTGERIVGDVRGRKV  
LVDDVATTGGSLLLEALEAIEEEGGEVRDAVVVDRQEGAEELKERGVRLSSVLTA  
DDLRLRDAESTARG
- 25 <SEQ ID No.:1073;PRT;Methanopyrus kandleri>  
MVEMGSGAWLELGKGLWFILPAYIANLSACLFGGGRPLDFGKKLS DGRRLLDG D V  
TIRGFIVGVLGAVVGLGEGLVVGDPWKAGDGFILGLGAMAGDAVGSFVKRRIGLE  
RGAPAPVLDQLDFFVGAVLLYYLVYGVWHPPGWVLVGLAILTLALHWLTNVIGYLLKL  
KEVPW
- 30 <SEQ ID No.:1074;PRT;Methanopyrus kandleri>  
VSDTLYETESLCPCELRVVPARLVRTAEGSVEIVKKCPEHGEFREV VWS DVEFFER  
AFEYEFKGGPVENPQTDSENGCPLDCGLCPCHESTTALGIIDVTNRCNMNCPVCFA  
NAEAKGYVYEPSLEQIEEMDLLRSERPVPAPAVQFAGGEPLVREDIVEIVAAADER  
GFHVQIATNGVEFARNPELAEDLHAAGLNVVYLQFDGLNPEIYEEIRGSRKVLELKK  
35 EAIKVLEREGISTVLVPTLARGVNDDQIRPMLDFAREFEVIRGINVQPISTGRTFREE  
RERMRTIPDFVKLVVEEQTDGRIPAESFYVPVIAAKIARLIGQLHGKRKPEFS AHPICG  
VATYLLDEGDWYRPITDYVDPDAFIDALEEVAEKAGSLDRKRDRAKAAWIVTKYLRR  
VFKGLTGKRKLARLVLDVVTGTYDALADFHWNALLLGCMHFMDPYNFQTD R VRR  
CVIHYATPDGRIVPFCPYNSIHREEIERKFGVPLEEWKERRNG
- 40 <SEQ ID No.:1075;PRT;Methanopyrus kandleri>  
LPLREAAERVVEAETVVVLTGAGASADSGIPTFRGKDGLWNKYDPRELATPEAFAR  
DPEKVWIEWYLWRRRKIAEAEPNPAHTVLARMERDGLLEAVITQNV DGLHQRAGSR  
RVIELHGNIWRDECVSCEYQRVNDPERGEGLEYDELPPRCPECGDPLRPGVWWFG  
45 EPLPSDALVEAENLARS CDV MLVIGTSGEVRPAADLPLVAKSCGATLIEINPSETALS  
PHMDVIIRERAASAMEALWNEIERLL
- 50 <SEQ ID No.:1076;PRT;Methanopyrus kandleri>  
LSDPLKGIIIEIRADLGYKESEDLWAASFLCELLRDHPRVLRPEDLPVEEEVVVVG A  
GPSIAELPKIVGELEDSVVYAADGACRALLELGIVPDVVVTDLDGPKEYLLMSSECG  
SITVVHAHGDNVTELAELVPTLGRILGTCQVEPPCDLLHNFGGFTDGDRAVVMAR

LGAERVLTVGMDFGNLTTEYSRPGEGRGVFRADPVKRRKKLAWGERVLRLVERELG  
VEVESLTVRR

<SEQ ID No.:1077;PRT;Methanopyrus kandleri>

5 VVVVGIVGASGYTGGELLRLARHPEVEEVRYATSRRLEGKPVWKVHPNLRRDYP  
DLEFSDPDPVEIGEDCDVVFTAVPHTAAMELVDPDLLEGGAVIDLSADFRFDDVDVY  
EEWYGVEHAAPELNDEAVYGLPELHRDEIRRTDLIANPGCYPTGAILAAAPLVEEGL  
VDVWIFDSKSGTSGAGAKPSEVTHHPECAEDLTPYNPTDHRHLPEIRQELGKLGDV  
10 EVHFTPHLAPLVRGIETTAHGLGDVEIEPKELRELYVEYYDGEPFIRVCEVGEAPRL  
WAVRGNTNYCDVGVFVAVGDGRVVVASAIDNLTGASGQAIQNMNVRFGEETAGLE  
EPGYHP

<SEQ ID No.:1078;PRT;Methanopyrus kandleri>

15 VRLEDILQMVETCNRKIDRTAFLIARSVIWDLEANGEVRKRAEQLGHEIVKRMEFSD  
VEDACEYLQEIRCGEVQVGVEDEADELVADMGYDNVVYDCISCCGAPEMGETL  
CAPGERPDPGDDRRHRRPGVLRDRVRMLGAR

<SEQ ID No.:1079;PRT;Methanopyrus kandleri>

20 MYFSKERKSQFRSGVTASTGDSGSRGDVALKVTVVVSDEPPLDPELRSGPGFAAL  
VEDGRHRVLFDTGPDPLLLHNLKGLGYEPEDLTAVVISHNHWHDHTGGLQAAESEV  
ARIVTPERIGVKNELVREEWLIGDMVLTVDLEGPPPERALYANGLLITGCAHPGIHE  
FVEWCVRRGLEVHTVLGGFHLMGATEIEVEKVADRLEELGVKIAGPCHCSGEVAKR  
MFRRRFEFLNVGPGLEVRV

<SEQ ID No.:1080;PRT;Methanopyrus kandleri>

25 LRVLQVVGPKDSGKTSFCEEAVKELRGRGYRVGYVKSXVGGHGLDLQDRDTGRVP  
ADVRVGVARKETVLFDLDDIDAVLGLLALLGLDYVLVEGFKSRELGVRVGFGGYTEG  
PTVPAEEIDTSPADAVERYAVKYTADIDCGRCGPGSCRDFRRAVARGEENPDGCA  
APEDVTVLVDGKPLGLNPFVGDVKSXV

<SEQ ID No.:1081;PRT;Methanopyrus kandleri>

30 VTKVAVEVYGCAANHDDGRLVRELLRREGFEVVEDAENADVAVLLTCIVRDSVDAR  
MVNRMRELERVPTVVAGCFPEAYPERARKLRPDAALVGPRHLDRIPEAVRAVLRG  
DRVEFLGEREDIDWKADAPRELPLNLAIVPIAEGCPNRCAYCAVKLARGNLSFPPE  
35 RILRRVKRELERGAVEIHLTAQDTATYGLDRGTNVVELLEDVVDLCSRYGARVRLG  
MFNPGHAYPISDDLADLFASRDDVLYRSIHMPVQSGDDEVLRMRMNRNYTVEEALEV  
YRAFERRLGYSFITDVIVGFPGETEEAFRNTLRLERTRPHILHASRFRPGRPAA  
RMEDQVPEDVKLRRSRILHRKRLEWAEANRELIGETVEVTMVMEKWGRDEHAKK  
TVFRGEVPEPGERLECRIVDASHARLVAEV

<SEQ ID No.:1082;PRT;Methanopyrus kandleri>

40 VAIIRSVGRAASNPPVLIKIVLGASPVLGIVFLSTLIVLGSTKLAPVSLSLIAAVLTSAP  
FQVLVSRVILDTLFLETPIPIGIIILSTIFCTVCSIIILYNELTQLFNIKISLATTIATPMATLA  
YMFTAASHAVSWARPGLIARRVTMPWALFVIFIVSLMIIHADQAYLVASTILVAMMLL  
45 SFIDVIQGVNRISKISIFTRGNLLIKSLKVAIAAFADYSVMMMSAIIYYLVMMFFDKFLVW  
SKYGFYFPLDSPSFVGMPLFAGTLAAIKFWDSVEEKDLLYRVDWDGMYALREF  
VMKAYWRSALWTLVLAGLITALIMLAIGISVHRTLGYISLAVLGALSFFAGLGAVKLPR  
KYAIPLLLATGALFLKVHVSNIIVLMMYLGSLPGAIIIVYIYPQLLTFRRDLEALLVTS  
50 AVPATELLVWKYFGESFLPMGYLTGAILAAGLSLIFSIRMYWRISREAYRVVAYNAFV  
SYVTEIPRRWG

<SEQ ID No.:1083;PRT;Methanopyrus kandleri>

5 MVEFRGSGMYKRPTVTVVTEATYPVALGGVTTWVQRLIKYS PDVFNVLCMTGPE  
RTEPVVEIPANVRDVVIQEI VPKGNKLRRLDRITPTHRLRWSTAAKTLRATFERMV  
EGEPLSEPMKLKELWKVSKSPTSVLASSTMYELARYVHYLASQYEDKCENNPFSDFV  
WVAVNIASFVLGAAAGARRLPNC DVAHAQNSGVCGFLCSVAKAVRNPFIITEHGIL  
10 LRELDTRLEGYGRRTTREL FKECFRSMMLTSYEQCEEIIEISDYHAELALEQGAPEDI  
KVVYSGIETWKYSPGDLERKYNEPEVLEVGTITRIERVKGIDVLEIAARTVEHIGNVV  
FHVVGPEDEAYYEECRKLVKEYGLEDIVRFHGPCTPDEVVKWLRRFHIFLLPSRSE  
GLPMALLEAMSCGCPV VASEVGAVPYIVDRNFGRTFRSEDADEAARHLVRLLYDPE  
LMFEMAHHATKRAKQYDVMRMCHDYFREYCKYARGD

10 <SEQ ID No.:1084;PRT;Methanopyrus kandleri>  
VSVRDKVRVLRCD CARVLEVEGVETPAPFLIPERLSVAVENVPEVREL VKELEELAR  
PYSVRLTPDDLPSWTDPAEALSDGSITVYRLESIPDAREFAEVVSKIRRS GSVRAV  
TVRDPEWIPLLFYLGFDFDAALCLRLTLEDQLLDDFSTETVETEDREELLRENWT  
15 QLQFCLLRLREAI REGTLRELVESVAARHPRIAEVLRVCDRERAVARYVNLNRNTQI  
ACATDLSFDRPEVTEWLRVRVRYEPPDWVEAVVLLPCSARKPYSRSPTHRIMRIT  
WNFPVDEIMITSPLGAVPRALERTFPAAHYDVRVTGEWSREEIERSAALIEKIVGDLP  
IVCHAADGYRKVGKELEERGYDVVYTCRPDGNPASRGAL EELRRTLEDLTKEGEPG  
DLREHVPRAVSRFQFGVDVLENDYRFDGQRVLIDGERAFSVPPTSGLLTSQLGA  
20 ELCVSSRVPIHAE EGTKAEMVDVPEDVLPGFHWPVDLGDEIRPCRVIARPEDVPP  
DTTVIETR

25 <SEQ ID No.:1085;PRT;Methanopyrus kandleri>  
LPVHPIESRYGSDELRRVFSEENKVAKMLEVEAALVRALSEVDFVPEEAADEVERV  
VEEITGDEEELRRFVERVKEIEAEIKHDVMALVKALSERCEVGGDYVHLGATSNDVI  
DTAHALVLREALSIYRRLHRLAEVLAEKAEYADLPMVGRTHGQHAVPTTLGMKFAL  
WAREVVRHLKRLRECANRVLVGLSGAVGTMAALGEKGPEVQRRVMELNLRPVT  
VSNQVIQRDRYAELIAL LALIGSTLDKIGREIRNLQRTEIREVEEPDFPEKQVGSSTMP  
HKNRPIRSERVCSLARVLR SNVQIALENVPLEHERDLTNSASERVILPEQFLLDEML  
30 RLTIHNLEGLRVYEENIRENLRLTKGLNMAEALMV ELVKRGIGRQEAHELVRRLAMR  
AWEEGRDFAEVVKEEERVRELFGE EELDEVLDPEKYLGVAPDLAREAAEKTRRDLE  
EIDREMKEVLGVGAG

35 <SEQ ID No.:1086;PRT;Methanopyrus kandleri>  
LVRKVRLVGC RHCGYCSQVVD CPVGDPLWNREDCVGC GACVPACPYGARRLVEV  
EEGPITVRVDGEEVEVESRWVEGALREIGHD VDACGVGGCYACAVRLNGEVVPA  
CNSKLTEGDEVETEDVDGKIRVVS GFQPHPVGGVGT PVELKDKPGYVEAACFAHG  
CNLRCPQCQNHSIAFGAAMGARMRPEEAARLLVGTAREYGVNRVAISGGEPTLNR  
EFLVEFVRKCREYGGPDLRVHVD TNGTVLSPDYVDELVEAGMTDIGIDVKGFRPET  
40 FAEVAGIDVKGA AEYVDGVL RILEYLADEYLEEVFVG VGIPYNPELVDKEEVFALTD  
WLYEHLGEDVQVCYLDYRPEFRRRDLP LPKYEDMVELEEYARSLGFRRVHAQKVS  
VRR

45 <SEQ ID No.:1087;PRT;Methanopyrus kandleri>  
LLDNVLEIVDDEDVEEVIDIICEHAKTGRPGDGMIFVIPLEDAVRARTGDRGKDALS

50 <SEQ ID No.:1088;PRT;Methanopyrus kandleri>  
MDVTKLVIHYLLVIAKVAPLVFLGFFLASVMILRVHERLGKLTGRRLARLGLTPEAAS  
AMAASLVSPSAGYPILAEFRREGRLDDRDVLLVATTFTPTTVGEMFLKGPFFAALA  
ILGPKLGTEYMGALFVTALLQTLPALALYGARSGNGSDIHPSTSHDDVPPLREAVIE  
GLRRAARRMKYVLP RMVIGILPMVILA EVLRVSVHGG LGPVVAITLANVSHYTVGY

ATAAELVHRGVLSESEAVAALLIAGCANVLMIFLKASLATYVSIFGSRLGLRAWAANL  
GSSVGARLLMAYAILRWS

5 <SEQ ID No.:1089;PRT;Methanopyrus kandleri>  
VAEENVIVGNKPVNTNYVLAVMTQFSEGADEVKLVARGRAISRAVDVAEFIRNNVM  
PEVEVKDIEIGTEEIEETEEGDTISVSTIAITLAKPSE

10 <SEQ ID No.:1090;PRT;Methanopyrus kandleri>  
LPELPSVEDLMSRNPVTVADQSLKFALKTMKRKVNRLPVTERVSEDRKELVGILT  
VLDAALAVADAMFGDRSPSRIKVSEVMSSPVITISPGATVLDAAQTMVLHGVSGLPV  
LDGDRLVGMITKTDLLELVRSEDYVALHMKDPITVSAGTSLHARRLMFEENAKVL  
PVVERERLVGLLTDRTLALRLREKSPKGFERSALKRARVDDVMRTPISVRTDYG  
LVDAAEIVRKRVPVGVVNYQDEVGVITKTDLLHLLVEELEAAG

15 <SEQ ID No.:1091;PRT;Methanopyrus kandleri>  
MAELAVGIDVGGTFTDLVEYDGRELRVRKVPSSPRRPERGFAEALKIVETDPDVVL  
HATTIGTNAFLGQKGLELPEVALVTTLGFRDAIEIGRQVRPQTYSLSPRKPEPLVPRR  
LRFEVKERTSPDGEIIVPVEDDKLRRRIARRIAVEDVDVVVAVFLHAYANPANECKAKE  
VLEELGDVEVVCSEVVCNEYREYERTSTALVNAVLRQIVTEYVERTWDAVRDAGA  
20 SEYYLMQSDGYAVPAELTLHTPAKLIESGPAAGVVAARYLGETLGRDRLVSFDMGG  
TTAKAGTVVEGRYEVTKKEYEVGGEVHRGRRVRGSGYPVLHRFIDLTECSAGGGTIL  
WTDEAGALRVGPLSAGADPGPVGYGKGGTDPTITDANVVLGRLNRRALLGEMPI  
DAEAADRALSELADELGLEPEEAAYQALRLAVEEMARIVRIVTVERGHPREFSLVA  
FGGAGPLHAAELAEILEVEEVIVPLHPGVFSAYGLLAAEVAWEHVTPVMRTLEELDD  
25 EELRAVVRGTAEKAAERLPREPDDVRIVVEARYRGQAHELEVQTGPDVTADELEEA  
FHERHRAVHGFQLNAPVEIVNVRALAVIERKPPSPKKEGEGNPKRALVETREV  
YFREEGYLETPVFDRDALRADDIVEGPAVIEQYDSTTLVPPGWRARVHRSGAILLHR  
IE

30 <SEQ ID No.:1092;PRT;Methanopyrus kandleri>  
LAGKAEILGEVVLCAVIYGYRVAGAVSEISGSLSSRWYGHARSTEDLAVRTVEELGRS  
LGWDPEEVRRWQAIVRTIGDLARRGLL

35 <SEQ ID No.:1093;PRT;Methanopyrus kandleri>  
MRVLGLDTGSTHVDVLEDGEVEDRVKVPDRDGKLEPTRRALRALDADERRVST  
TLPINALTRGRTDPVHLVLIPGPGLDPEPLLDLADRADVLPGYVDHRGDIVEEPDPD  
AVEPSGEDHALAVVAKHSHRNADPERKIEAHRETYVEAVPGYHLPYGNFPRRVAT  
AVLGARVKRVTRRFLEALGRVDGVLRGDGGGLQTPEEALRVVPVNLHSGPAAGVLG  
AAYLTGRDDFLLADVGGATIDLTEARGGRPVTTEGAELFGYPTAVRAAIVRSLPYGG  
40 NAVLTGEGITNDTATPACYGGSEPTLTDALVVAGYHDPEPDGDPSKSRVLRELGD  
PHEVAEETLETIRRELLRFETHDSVLWAGALAPALRELTGVGEVVPVHHDVCNAVG  
CAVARHAREAVVYVHTERGYGHVAPAGERFEVDRGRVYSREELVELAIEAAGFEP  
DEVVRFAFEIVRGGVRVGQWAEVYLYRTPGVEPPS

45 <SEQ ID No.:1094;PRT;Methanopyrus kandleri>  
LTPIDPEEDARLEWERSMARLGLKYVPTVVISRVRGVALTLEIFAPVSAPAGSSAIVF  
VRPYLLTLRGGGPLWEGTLEFRLNGAGNSELGRIDLSEPEVWVGDWVEFEFYTPPE  
ESGKYRLVVRYEOPYGTVREEFQLRIVDD

50 <SEQ ID No.:1095;PRT;Methanopyrus kandleri>  
MEFSYAAMVAVLAAARGFAPVFVEHLPCESCRGKNCEIIRSSRCLMVATTELLCDV  
NVGAHVFFSDDLIVYRGVGDPESGISIHVDVHDAGPDAARRILDRAGDALNRGLMFIA

TWDARHGPPEEFERHAPEALNLDVTGLTLPIDRTGLHPTDFRVVSAAEVRPEDVA  
DFSDLDLVDGRRYVDPVLTAVA EVLGERAVEGLGAIRLEAPQGETLEWWMDSVK  
RYWKQLRVRSALRNGPSELAAAFWISILEVGTRLASDGWSVDRDRTVEDAMRKSAR  
MTEALVPKAIRSLLLGLAVLVEGL

5

<SEQ ID No.:1096;PRT;Methanopyrus kandleri>

LKWWVEVPVRPKPSVLEKLHAAVSEPCEVLENFELFRAMISTLDPDKPLVRALRGE  
EIHVHPVRFLLEEVLD PATLVDAVERITRWSLSGVFELRVALEEVTETPDVALGYL  
LEIRRAFLSAVPKYLEEPCLETVAGPLLVEVALMACTEGFLEDEDLGKAAELVAKAV  
10 DTDQCIVEALPSLEIQYGDIVPKFASPARVWTIFTLLCHTCANRLPPLEELAEPLNV  
ELGPVEELELLNGYLEEAIAALEIEDERVERWISDILVDTVERAAELIQLLSQPTLAE  
NILNSGATVRVGWIEIEPKEYDPLWEEKGAQESLYSRIKRIQNLIGVEHADEVIERAS  
ALGGVELPVGGGVEVESSVETLRRMIG

15

<SEQ ID No.:1097;PRT;Methanopyrus kandleri>

LAGRPSIRYRYGIAEIPGDPKLAYETMWAALQGEARRIFDGLSRRLRRDPSSFHRSV  
ERLWGEVRRRAQVSPALWELARELGLPEGTNLLNLLGRLLGLR

20

<SEQ ID No.:1098;PRT;Methanopyrus kandleri>

LAVFALWSLLRLLWGPRAGPGTVVAVVNLTA VGAATWALFSGHWERLSEALQARS  
TACLVFFAVTIPLTVYGAWRIIHDFRRRLCGRPDPRDVAAARVLLQGARKLWKSSEE  
RGFG

25

<SEQ ID No.:1099;PRT;Methanopyrus kandleri>

LDWNDPLQPEESALEKLHVAMPKPCETLGDFEIFRRVVLSTLESCEGLAGLLKGEGI  
EETHPIRFLLEVLDTPSTLAEAAERLIHWTISGVSGLWEGLRGTVDPAEIVLLHFLQL  
RRFFVRRTPEYLEDPGLESVLEPLSVEVALMACAGGLLEREDLKEAAEYVADGVGV  
DERVLELLPELGVRYGSLVPRFASPTRVWVIFALLCHTCANRTVPPEELVKPLKELR  
PGIDEIEYSVREALHEAVGGLGIDDEEVLRWVGSILVDSVEHALELADTLRWEEL  
30 AVKIPGAGAVIRLGEVEIQPGEYDPIWEPGPQEEVHESVVERVRELVEEEANGAVE  
RLYELDMEEAGELVGDDALDDLLDDSIEELRKRRMR

35

<SEQ ID No.:1100;PRT;Methanopyrus kandleri>

VLETILLATVAWTVQDHDQPFATYWQDVKFWEILERHPRTLVDPYCGPDDRPWT  
KDEIRTLREHGVKPVAYLSLATVGKHQTDLYSLAEKGLLGPRDPYWEGDRAVRF  
WERTWLDALRTKFEELRDLGYEGVFIDVDPWTLDWYVKWFRRETGENLEKLREL  
TYDALEELIQAALHLGLEVYVNVGGAIFDPKLAELKERYGFKVVEDVITDDEGNLVP  
DDVFRDYLRLAHLGSGVYVIEYDLTMTPEVNERLEELFAETKVEAVYVTSLDHDLR  
GIDIVPIKAPVNPSDTSGSSGEEKASYTRENEEDLERIPVEELVEEGPKKLPVPIVPP  
40 VRRRCLSHG

45

<SEQ ID No.:1101;PRT;Methanopyrus kandleri>

LCLVLVEEATTVP TFP GALYVLDPPGEPGR LREGPELTDEEGRSVVPFVALVEPPLR  
EVIRVEGTTLHVHPDAVVHVPDQPVVLTGYACDDRHTVTAVLPFRSFLVALDHAR  
HGPPDPYELFEVFAILYDPIQAAFTLNARGHALLIDEHGVNEHAMLYTTTPGHGPGP  
DHISSRHVRPSDLQGAPKHVTGDGPPIPRDRYLDLLARTQLITGVPEPGRADFRLL  
ENVHEYVRPLLTTHLAHHWETRQVHEETGRLVAEILRGDLHREVADAHKRAVRAL  
GSRYPTPAYAPDARVRWARQLAGPVSDRVLT KVQDFARLVACHRLVNRLWTFVDT  
VTLLGYEECVDLVEMASYTEHDLPGHEIERLLRPWIDALRDPHYRRLERGTAPPPK  
50 LRLVEPEEPEDLLVCYDRLL

<SEQ ID No.:1102;PRT;Methanopyrus kandleri>

MVPRQHMGLWGLPHLSEDERLRKVKEALKSGRLSLTDAVLATICVAYREFNMGITC  
 DEIVKVLRLGYNNVNRKRIYSLASRLKKEGLIESNRVSGRAIYAIKDEDKAIERVLGK  
 TRSVKAEDLLKALEEV

5 <SEQ ID No.:1103;PRT;Methanopyrus kandleri>  
 LRCTRCGERNAEYERPYAGDAVCGRCLVELVRDRVFREIRRWRWFRPGQRIVVAL  
 SGGKDSSLALRLVTEYVEPLPEVEVIALTVDEGISGFRDACLAERVADELVEHE  
 VVSFEEYGFALVEEDVDVSACTLCGVLRRRLNRRARELGADVVTGHNLDDE  
 10 AQAALMNFVKADLAQLARLHPEVRPEDDLIVPRVKPLRGVPEREVRWVAEELGLPF  
 HADPCPYARFSVRSFFREILDEMEERLPDVKFGLVRLDRAGPVLAEAFLEEGLR  
 CERCGEPAAGKLCKACELLERLG

<SEQ ID No.:1104;PRT;Methanopyrus kandleri>  
 VDPEIALQGLREHSTVYGEEDRVPVWFAFFPQVLTFLGWLTIVMAKTFPGHATFLV  
 15 LLGLLEALIGYPLAVYLMYLMIKRRNEHVTRSLGFLRYLVELLAGVGYDVIDLRSELE  
 EMRLHTERRNPVIYALLTLVPPIGWLVALYIYHFLNRDLHEHSVRERDFLESVARLLD  
 MNPHEPPFELET FYVPRRSTFLYFVLTLLTAGIFALYWWYTVVQDPNRHFRAHRR  
 LERDLIESIEQAFSD

20 <SEQ ID No.:1105;PRT;Methanopyrus kandleri>  
 VILTDPQVAGASGDMVLGALIAVGADPNRLEEVEHVSSLGHEVDVHVHEIQKRG  
 RAVRVEVDAEGDLRDPDELREAVKTVANVLEDWRRELPELALKYLLRAEERVHG  
 DLCHLHELGSSTVVDLVGTAALLEDLNPKASEVLPPNVGSGTVETEHRPVPAP  
 AVVEVLSEWDVGIVREGEGELLTPTGAALLRTIDELLDP PPPPYRVKRQGFAGTK  
 25 DLPDRPNVLRALICEPGGSGEHRIVETSVDDVDGEAVGELIEAVLQLEGVHDVEVL  
 HGFGKKGRPRFVIRVVTEDRPGIEREVFRELFRWTGTLGARVYRCTRVTADRRIVD  
 YDGIRVKVSRFEDVHHAKPEWEDVRRKVDRESAPLTRARLVGDLRKRYEGDGEDG  
 AGD

30 <SEQ ID No.:1106;PRT;Methanopyrus kandleri>  
 VKEVRLFVDPENVGRVMNAMADVGTGFYAIEYRGVAPDRWAGFEIREDPESAIKA  
 LNDLSERAVMIVTVVPEECVEKLKDAEAERLAGERYTIIVTDVEEIHVDYGR

<SEQ ID No.:1107;PRT;Methanopyrus kandleri>  
 35 MIDDGFSPESLRERAEAGSVFTAELLATNKMVMMALYSLGGERSCASVFRAGR  
 MLAGFFGVETLEDALHTFCELTGADYDLDRNYVAIESCPECLGYVNAEGAVCNFLR  
 GFISRAAEHELGEVVSVAQVACEATGDRRCEFILGERGEVGGFDTEVDEMTAEDIEI  
 VMSADGRDAVEVAAFKIASGELLRCALSDVARPMFFRAGRLYARAFINAFDPEDPD  
 ELIGHVEEISGSSYSLEGDRFIVEKCLECAGMPFKEPICHAVRGALAETLEHWNVPF  
 40 KDLVEVRCAAEDEVVGTCVVKARGVIWKAKRVVDAVKRAFH

<SEQ ID No.:1108;PRT;Methanopyrus kandleri>  
 LEYGCLIGGEWLEGDREIVVENPYDGSEVGRVLAPEVDVEALLKDAREGQRRWRE  
 RPTYEVREALAEAAHLLKKHEDELAELIALEGGKPIRDARYEVYRTREVLRLSAAEAE  
 45 RLYGETLPGDAQRGRTAELILTVREPVGVLSITPYNFLLLPTHKLGPALAAARCSVV  
 HKPATVTPSSLRLAEILLDAGVEPLALQVVVGPAELGEELARADFDALSFTGSRS  
 VGEHLREISPIPRITLGGNDPVIVDETADVEAAAEAAVRGACYHAGQVCIAVERAI  
 VVEDVYEEFLEAAVEVAESLKVGDPLDETDVGPLIDDGAVEKVRRHVEDAVERGA  
 EILTGGEGEGRFPPTVLADVPELALVAREETFGPVLPIRAKDFEEAIRANSTDYD  
 50 LHAAVFTERLDRAVKATRKLEAGGVIVNESTIYRADYMPFGGVKASGVGREGVPQA  
 VREFTEEKT VVIGRR

- <SEQ ID No.:1109;PRT;Methanopyrus kandleri>  
LSGTETVRLRAVSPVTSRTGESVVDLREDLRRHLRALLGRCLERGEVRRITETALFG  
GTVNGETIFPAVEFRLVGDELPRYPAGSVFELEVRVESRELPWSILSRYSDDPVEFA  
SECLGWALELLSLLGGVGAQSDLCAGSLLWEGREPRRPVDVLSRTDAALRWVEAK  
5 FGDVPDRSPRFAAFRDGYFLVAVGPTGDLYEVLGRVESVYNRLARARFRLVLQVK  
RTRDGLHFPVAVAFARHARERVELQRAAATFLDLGWETLPKLLDLAAESGRRSRPI  
RF
- <SEQ ID No.:1110;PRT;Methanopyrus kandleri>  
10 MELAEAEKVAGERPELAGWAFRILVEARDRRQWGIAEVAFRNALGEVVRLRDLKN  
KPPTTWAKKWCKHGVFRGMPEVIARGEFRFVEQLPDDWLTPGERARRQLLQG  
HFRKSAGRARYAIRIGGIMYVPTLVGPIATYGLAYYLVRSVPDHLLAGARTPMKLVEV  
AEENELAITSKDIERAGLKPEARTFRNLRYVTCKVRIFFPTEECKLAGRFDVGLLELV  
TRYRKGIMETFTG
- <SEQ ID No.:1111;PRT;Methanopyrus kandleri>  
15 MLLFSTAIPAEVKRGLGEAGLRFGTVFEVVGGLVLPYIAEFSEEHVVEGLARIDKEK  
VRSQGAVTPALGIPRKKVRNYPLELAQVTLKVRDVLTYKAAAAYFAWIAREFDVSV  
SAVRAILEDSEFLEALVEILCPVNPKAAEVLGFRGRMWRDEARWLKFEEMARKAL  
20 ELAEELGDNRLRTAAELILRGKSSGPTVPGARGDHDGVVYVDIGKVRNFLVERMLK  
YGESSRKQPDEEIIIEALVTEYGVDFEDVHYAIAVLSEGRIPAGPLRTDARVLLDNVAG  
FPGKVERDVPAPWMRKSYGAWFSDLRRLVPVTEENFNDVMRAKGYGISLEDVEED  
SEWYLGKTVGKVLGEGDAKVPPEAREITQTENVKFVNAALRPRHALSREEVEEIREV  
LGSVETDVPVPIEGIVVEKALTEFGKLMPEDISAAISRGD
- <SEQ ID No.:1112;PRT;Methanopyrus kandleri>  
25 VLLSLVLIGILPLPPSASAATVYVHVVPYLDSDAWSQDHVAALKEFLSWCEERGIKVA  
VFHYNVCEETAPGITDLIREYAERGTISLVGLHSTSHALGGLPLSLQYWELEFNLQFL  
RDRVGSNVAQVLSVPSWVFDANTLYACDKLGVRVIVCGTDITAINPDYDPTWDRLD  
30 PIARHMLVG YFNVRGDRLYYIPALS YVSDLVQAAEDRGTTVRELLQNAVRNLIDSGV  
INVTGDVHLAPWVLIHPWELADADV RQEFENFLSEVGNGSFD FEYQGVTVTFELSD  
PREVVNMISSGGTNLGLVALPEPDYSSILHAADYHHWWELIDLYPDKSKIVREWLDT  
MSRWRALDSALWDLTVNGVIDDSIRKDL YRAVERVWNEALLENVLEYWDPSSARW  
SLLEERKALSTVYREILT LHAELVGSMVQQSRVESLEREINRLEQGLEDLSRRQQDL  
35 ERRLESLEREFQGLKKQKSKRGLPVLPA PLWWKRRNPFGRRHRC SREGPSHPFC  
R
- <SEQ ID No.:1113;PRT;Methanopyrus kandleri>  
40 LHELLTFLTLVSPVAGLVDGGS MYLTPDVHTVVG TQWDVTRVLTTPELDEGAVF  
VREGDRWRETMEETSTRFGSLRRLDDVRVRWSGGLLHVQCPKSAEVLLLVPDPE  
GIPVTEGSTFLEGGPLPEGAHVLLGGCVIRIRYRGPVVLEIPFETARESIVSVRWIEG  
TTYEYTDWAAHDWDRRFRPAFLLPALVSCVRRCG
- <SEQ ID No.:1114;PRT;Methanopyrus kandleri>  
45 MRVLVMAIVAVAMVANSASAITGKATTNGATPEEMLENLRVHVVAEEGATLDLKEH  
PVVVGEHAVYVVMITEGDAKSSGETYEEQPLLVP LPKDGV RVEGDTLTVTRPVDTI  
GYCLSPGS AVPGWNGPESLVVPTW EGLSSKLAI AVKPKDIEQVLATGVCEPEWVKY  
VRITPTTVRRAVRILDSNVEWTRYFSWDAQLKIWDALWPTESGSSLT ELLPKLLPTA  
VLALPLIAYLTQYL TSHAEGTFSPGPTGSTVQSVNPGSPQETSEAQRETQQEVIES  
50 PSGGEETPTITITESTPSETIEAHFAAVKGGPTTRVSAGSSVGGATGRPVRTGTSG  
VCVGEHSTGTPPLLPI LAVLAATTGLLLCRKGLSP



- <SEQ ID No.:1115;PRT;Methanopyrus kandleri>  
VITLYDQSGEIVSQETIEDPPETGSRFKVTGSGSYRAVLVLQCSSGLTTESVASELS  
TDVMEIVLPSVRIRASTDVQPGEGATLRVDYDVDASHAEVDGVEVLYDEDGYVV  
GKKEVSDLGSGSVTFDVKDGT YKVLITARCRDADTGTQFSTTTETGVTVQIPRASVN  
5 GALSLVKKTPKNAVLSAYYEINTTACTPELLEIALYDENG NLM DRKVNNPPKTGSV  
TFTVTRSGSYAVMTLQCSIDSVTESVSKLTDDAVAVLPSVRVDVDARPTPESAT  
LSVEYRVNVDRAEVD SVEIFLCDESGNVVGRKTLADPSG SVTFEVGREGTYRVLVT  
VHCRDADTGT SFSATAGTDVTVKLP RYQPHSPQSSAEG RTEGEFHTQSGARSATE  
EQRGQTIRSANRLQE QREGRPTTQPTTESSSSDRVFPPEKLQGRAEENVVEEKGS  
10 GGRTGGRSEERERLEETQSALQRGRPTSAEMEARIATVELTTAGRSFLIDVFEDGT  
LRVTTEDGTVRTVKLPLNVKSVNRVTPTTLEVT LQNGRKVYLTVD ERGRLFPKKFVI  
LGGAEKPHLREGTGHAPILPVIPIVRRRRR
- <SEQ ID No.:1116;PRT;Methanopyrus kandleri>  
15 VYNDSDAYSEDQVKAYEDFLTWC EENGVKVAVFHYPECEFEAPGITAVIREHLGKS  
VEFVGSHGTAHSIAGLPPEIERLQIEYSWEFFKEQNLEPGLRKDVVSPSIEWVIDENF  
VHVCRELGIKWIVSGYRTWEFNPEKVVS WQGEDMDYLADVLIVKKLDIDGDVYVC  
PVIDFGELVDDVEQDIGPYGLES LKGAFFRAVETLLNVGAIKGNNDGKADLV LWVLI  
HPWQLVEEMGSTGRTGLDLIEEFIRWVKSGSLDFTLYGVIPVHFELERPSECLELVR  
20 EIAENPDAYGHPDVTISDL DWTSMVHASDLRTVEELEKKYPEIVKLWREGMDVLKSI  
APRLQRLKRTELDPLVRDV LRTVNEAQLSCMCESEGIQYLEVWKAELELLRDYLD  
GSASLLTTSADDNHRVLV FQYS DGGIAAVFLDRNWWCPSPGVVRGKVTLDRADPT  
DLVVRGEFTSVGLSDITGGRIVVEDENG DVIAEVPFTLDELASGVTISLPKDRRADTV  
YVVLSGNVQGR LWDQFQIDL SLPIRYRERVSAARYP  
25
- <SEQ ID No.:1117;PRT;Methanopyrus kandleri>  
MAGLPPWMAGALYGLIEAIGWDEL RPEALHDLMWRLTFHTVTASAPTIPAVLYHALV  
NGSPYKWTTTAGLLVDLLTYSLSAFFGLRS
- <SEQ ID No.:1118;PRT;Methanopyrus kandleri>  
30 VCSCTHRAVLIEYREHV VSVTGGRIAVSLPDGSTVEVPADSC LLELGSPDMAAYR  
VGNRH YVGFP IAVTYRGRIYLLGSFRLTMGDAPIVERYAMRVL RNGVEFDVGYSEIT  
VYEPRTL PVDRLAPFIRAAYSVRCTSAELRDGVLGLTLEVTEARTVEVSQGKS RAP  
VERYLLL CDLRAGTCRLAGPVGGSPTDDDHGIVCAYDLNSGELTFTIVGDSLPR LPP  
35 LLEELGADPAVITSLKLVGKVLSGDYWATSWDYWNLVKRASDP AVRHILERSGIVAA  
VPMRVVLHPELLLGGYLLAAGTIAGTSLGLVWL VGPDICRDAGPPRHFP GACFESS  
TGC SCTG
- <SEQ ID No.:1119;PRT;Methanopyrus kandleri>  
40 VPPPIVLALLIMIGPASGAIVEFSEEP ELVGKLISR VHDLRATEGAVRELNAAFAPGE  
VASVSGVFVYPPGSPDRVP
- <SEQ ID No.:1120;PRT;Methanopyrus kandleri>  
45 VFRLGTTPRATTYDPDARIGEVASRFG LPTRVLIEIVRTESFQ RSLRRVTS GKPVVLD  
LRELDSDLASWIATHARLVEPALRELVRTVAPDVEPRVRFRGLPHRFRRVERIRPM  
DGALISIEGVVREVRGAERLEHAIVDTGSELVAVRLHGHRLGPGLRVEILGIVRSATL  
DALEVHKKDPIPEVHPDPAELEE FRELADKDPLTTFARAIAPLPGAEEVGKMLALQLF  
SCVGKN SERLHVLLAGYPVVCSEILHHVLDHLAPRGVYVDLRRTELTDLTAVLKEDR  
GWALRGA AAVLADGGILAVDHLEGAPEPHRWALMEAMD KGTVTVDGIALNARCAV  
50 LAAINPGEQWPSDPPIARIDLDQDFLSHFDLIAFLGVDPRPGEPEEQDTEVPSYTL LR  
RYLLYAIREHPKPEL TEEARKRLEHWYETRREEVEERLGMGLPTLPVTRRQLESVE  
RLAKAHARMRLSDDVEPEDVDIAAELVDWYLETAMQIPGGDEIRISS LKP

- 5 <SEQ ID No.:1121;PRT;Methanopyrus kandleri>  
 LRLNAFVVYARPKGPSLTVDSGVLERLGAGCREVEVGSRLDLPLKLVEDGLVEPGR  
 VTIIYPTTWGSRAPARALSVKRMETVGYEVHVLVGTEGGSGRLPEGFPGEVRVE  
 NVKRDLSGILKLSDDIFGLFWSEGSLLLDLGWARDPGPRSDLAILTVSTLVALKVVEN  
 TSGERPLERTVMMMEVDRRLVDASELLHALMVALDLAYFPIAPDLGRTVREGIEELL  
 EGLEGSEEREELRKAADAFERLSGSVLDAFELGRVEIPDRPGILRELLEYRLRGLSPA  
 MIDGEFPRRAKRMLKKVRRRLKRGDGRPDDTSSERPKRPKI
- 10 <SEQ ID No.:1122;PRT;Methanopyrus kandleri>  
 LEVHYELPLGGAHLAYRAAEAGHDVVLCDPSFDISEESMERLESAGVELVTDDTAG  
 VEHGEIQILFTPFGHTVKIARELLDDVREGAVLCTTCTCPPIALYHGLEGELRTKRED  
 VGVSSFHPAGIPGAETQDLILVADARSEESGIELASEEQVERCVNLAEDMGYDVYVL  
 DPELISSIGDMSVVLTVRIVQAICNYFSVARICGAPIEMIEEQVEEVLTSTMAYLVGRYG  
 15 LDAFDRMDGKLLLRSLRNMALTEDVERVVDFFERCYVDLLSGDRESMRELSSMMV  
 PPDKLVDREVIVGEAPVQYARRRFFEEERWGS
- 20 <SEQ ID No.:1123;PRT;Methanopyrus kandleri>  
 VSSETSELDEYRETFRELYYEEALKGFRAHLTIYLGCVAMVVMNLTTPRVIWVIWP  
 VLGWGAGVYCHYLGVRRAERNIRRLLEEALRRVQGP
- 25 <SEQ ID No.:1124;PRT;Methanopyrus kandleri>  
 LRMIAYDLGWFSRALLADATVAVIGLTIVATLIAYLGLGGPLRPSLAVGAAAGALGLVI  
 YWYGTLLASSCRIRGVGRTDWGVVGVKCRRTSSVAVVGILGEIGEIGVERGRIVKRE  
 TQYGLCLYKLVLPREGELLWYVGQPEGLVATVGNVAVFSDDLPRVLYLGVIATG  
 SLEWFLDVMPFSTLADLAMEPAWRIVRESSSISCAPSWDRLAREVAVDPGMTAR  
 ALEGRVALVHRDVALFFLSVLIVVLGVPVALSVLSGYGPVLYELIEPLVAVLQGVCGG  
 TFPVLICTLLAALLVGAVLLLTSPLLTTYVGFVTRLTADPHA
- 30 <SEQ ID No.:1125;PRT;Methanopyrus kandleri>  
 VSVGPAHSFEPVHTEPPGECTSLKPLLTIFLAFTVIDHGVPLATYWQDVNLRVILEKR  
 PRTLWVDPYCGPGDRPWTEDELRTLREHGVKPVAYLSLATVGEHQRDLYRLTRSK  
 RLLGRPDPPEWPGDHAVRFRERAWLDALRAKLKELRDLGYEGVFIDVDPWSRDW  
 YVEWFHRETGGDVDELKGRSYRALEELLRTARDLGLRVYNAGDAVFDRRLAELK  
 35 DRYGFGVVVENVVADEEGRPTPGNVFEAKLRALERLGDWVYVFEYGIDPERERNR  
 LTELFSRTDVEEVYITSPDHDRLGKAAPPTALLKRPGSTMGRLKLLVA
- 40 <SEQ ID No.:1126;PRT;Methanopyrus kandleri>  
 LIVVGAGTFGCRVAPYVASAFEASSVVLVDTDPDGIQSGEELAKKLGLQTSRVEVAYG  
 SPSGAHRDYETAMKDAEKSEALKQLSEKFVEVVKLEYRADRVPLVWGLGGAIGA  
 ATAIRLGEEVPYALHVTVLPDYRSEVEPVRRLLFNAKKQLQSFMGRLKRHPVIGDF  
 AGVPADKVGEHLVCILSRHEIVDKRRVQTANYVRDGDDEIRMAFLVDVNRYGLQR  
 VQLDRIISQIQEMLEWAEDFVECDLAGRIRAARLEESLRTGIWDNDWKEAS
- 45 <SEQ ID No.:1127;PRT;Methanopyrus kandleri>  
 LFIGVLLAPTVNLLLLISLVKLLHVKCSLQGAELIARIAPMMTLGVVPAVTVEARSLLTR  
 IPPTATVERILTVLNVPVAVFVYAFSFFILVHCYLS
- 50 <SEQ ID No.:1128;PRT;Methanopyrus kandleri>  
 VRPLIAHVVGIACAVSLTSVLPILPLYVVDAGYPRSFVGMNLVHNVTQLLARPVGG  
 ALTDAYGPRRLAPLALGYALSDDLVLVPHPGTLLASRVSLGLGMGALWPPLLSTVA  
 DSGRSLGVFNAVTVQLPMVLAPPLGGYLYRSVGPWAFVAVLALPALLAVPLAGSLPDV

RTSREKVSPLEVLKRSLEVDRELFRAFLPAFATAAVQPTIESFVPLLLKKLGADPAQI  
GLVLAIRNAVAVTLQAPCGWLADRYSPVLAALGCVLAALGVLVLPFVESVPVAVVL  
LCVGGVGYSLAQPSSKLVAEVSGERRGLGMGWGWSIMSLGRLTGSLPGLLADVS  
LSAVFYISGAIPLASVLP LLRRPR

5

<SEQ ID No.:1129;PRT;Methanopyrus kandleri>  
LRLPAIAAGLLILFAQPASCLKVAVFAADDVEPTCLKAIEKVLRDAGVPFDEVKGKDIV  
DGTIVERYDVLILPGGAYSERVVHHPRFIEGLKEFARAGGKIVGICAGAITLVKGGLV  
RAKVEGAGLGVGKVTLELERDPLTEGLPDRLEVITYINGPVMRSQGAKVVARYAGGI  
VSRGDAILVDYRGKGEVIAIGHPHCHDERGNVNTQGAKLLLNALGVKKRVKSGKVE  
GEGWFPTVPVAAVILGLVAALGVRGLISRRGTGVK

10

<SEQ ID No.:1130;PRT;Methanopyrus kandleri>  
MTARRFRPGTPVLLPVIRFFGRVIVTPFCFTVGREPVPCRVVVSYGRGAGPVDFRE  
LKVESVNFMCPVSLPLAVGFGVRVLGERSVYRRSGRHS

15

<SEQ ID No.:1131;PRT;Methanopyrus kandleri>  
VSDAHELALRRRLKVDLSLLKRLGLEGSVVRNVRHPLGLLVKLAEELVEPGRVHA  
HLPLYTPPISTVLRLLSEEVGYEVTASVEVIAEDDGRVEEVREVVDREPVILGLP  
GVLTLSDRVFELASERAPLFLDLGWALHPHRAVPSVDLTTVPTLAALRAVESVSGED  
AFERWAVARLGHGLTVDRGKVRGSGGGGLKLVDTVLRALSVVLDLARYPVAP  
ALGPTVRRELERLLDGFDPGEREDLTEAARAFELLSNLTPGQTEEDVKIPEHPSIIRE  
VLEDRLDLVE

20

<SEQ ID No.:1132;PRT;Methanopyrus kandleri>  
MDVDTEELVRMAEWKLSEAERALEEGPESPAVAEHAQAVELLVKAALRELDVEPP  
RTHDIRLLGVLTTTELLDLGEGDLAVEVRRIAREHRDTLASLLEGYFSLFEPFEGDA  
EEVVRAAGKVFEDLRRILEKVR

25

<SEQ ID No.:1133;PRT;Methanopyrus kandleri>  
VDTSGHRWVLVKVYFPAWHARGGRILMGPGGTMIVRTGSGRMILYFAYPIRLHAL  
GALALALQWINAPVRAMMEG

30

<SEQ ID No.:1134;PRT;Methanopyrus kandleri>  
LPEYPKPGTVREAVVLSVPGDRATLDLVFDPVPPWARVLDLYLSAGSRVLGAGMVP  
RSAYSGLDHYVPAPELPGFVRLELAGERTERWSSDRFPATDPWLRGLLKRHGLRW  
TVVRYFLPRNGLFWARCEVPLLDGFVWPAPFVGGYVYGGVTEARLVPEGGPDR  
RLTFGLPPLSDLDATLVVLVDGPPAVVSSRGFHRVTVLFRPVGASPEAYRYAAD  
PLRVALGLLGGAVSLLVRPTVPKALAALLVLPVAGLDYRWPWLTGWATLGPVLF  
LCLLHVL

40

<SEQ ID No.:1135;PRT;Methanopyrus kandleri>  
LPGRVPKDVWLLGAVSLLNDVSSEGI FALLPYLTALGGGPALVGGTWGGMELVKS  
LLNVVSGRVFGRPGWAKPAVAAGYGFSACMKLLALVRDPVTAGLVASLERVGKI  
RTPPRDAILAGLAGSEPLVFGVHRAIDTSGAVLGALLAGVLLTYGVPAATAVLFA  
LVGFLSLVPLIPVEERLEEGSSEGEGRFRPRALAIVGLYRLGAVGWMMSLRVLG  
VQGPAAAFAYAGFSTLHALTSVPAGRLSDRFGPGVALCLGYAMTAATALLAGSGL  
AVAAFMLYGLAYGVDAVERAAVAELSGTAASYGAYHALVGVGSLVCGLLVVGWLW  
ESVSPWAAFGYSACLTGVAAALAPVLILRRGSGG

50

<SEQ ID No.:1136;PRT;Methanopyrus kandleri>

VPELVESHVHVPIPSDPVERIRALRVLREVVYRRGKKPSLEVITYRTVGGSTCGPYYVA  
RWRKDSRFKHGRTLYLDKSENEVSFVEWLVSLDRSEVLELARHLMRNLRSVLCTL  
LTEVLSLPYKKARRVLTRGLALAFDARPSNSPRIRDLEELPDRLESFAVRTLGWP  
AHYSSYLKRVIRSRRSLDGRHEVPDVELELERWKL RHG

5

<SEQ ID No.:1137;PRT;Methanopyrus kandleri>  
VSGRDLYVLEARINRRNYREFVSRWREWGERIARVARRLLGEGTRVFVFGSAVKG  
EALPGSDLDVLIVSDGVPEDLEDRVDLIREFERELDLPERHPHIEFHLATPEEYEEVWR  
VLLDEYEEF

10

<SEQ ID No.:1138;PRT;Methanopyrus kandleri>  
MRRLRKLLERAEGSLEAARWLLGRGNTDLALVMAERAAGLRIRAAQILLAGEHAR  
GHDLRDLRGRAHRRVRV

15

<SEQ ID No.:1139;PRT;Methanopyrus kandleri>  
VCEHAKALDVLGVAYTECRYGAWEPSEETLEWAIGTVEELFELLERVERDHGPASR  
P

20

<SEQ ID No.:1140;PRT;Methanopyrus kandleri>  
VIPAVGTGVGAATVLGSLPPYCGWLAPAAMLTGFLLTLKYERWVRDHRIVTVWGR  
VWETVRYYPWPSRSTRSAPGGGP

25

<SEQ ID No.:1141;PRT;Methanopyrus kandleri>  
VVAILAPQLVVTGTAYGLFILHIAWERRRKRAMDVLGRGVEEKKPRSWEPEEF  
KNSRCDPVTRLVFRPDLINCAPSGYLLVSTMGWVALAFTYEMSVLLGGHSPPSVR  
FELVSTFAGLLVFSYRSDVATLLPGFRSPRSRGS

30

<SEQ ID No.:1142;PRT;Methanopyrus kandleri>  
MRTFQFHPVTTAVLRTPELDEGALFRLRDDRWVEVASGDLPGTFFRRLGEAR  
SEWREGVLRVEGPPGAEVVLLVPDPEGFPVTEDESTFLEDGPLPEGAHVLLGERVR  
AFRTHVPWRVRLPFEVARESLSVSRWVEGSTYYEHSDWAAHDWDRAAVSHPARP  
RPELRV

35

<SEQ ID No.:1143;PRT;Methanopyrus kandleri>  
VSTDDGWIVVRVSSFYHRVGIVTFGGHVEVDAWRVHTFLRDEELAERLADVLPGR  
GELLACEGLLSSYHEVFVRPRGDEIRIKPSGAHTIVLVSRGFVLTRKPERVRELRA  
RAVLAVAGLMEGKVSVPKRWIKAFVLGSRGRLAGIEVKSLAYLGFEAIDGIPPIVGPS  
TSLGLIVLSIDAWDEVCEKLGVGWELEVDIKTVLLILTISYFVAVGACIVRTLGGGREPK  
ELHYARMWEELEGDSNGVGEATIADTRKEEDSEEDVEYDEPGKWIRKRRFKSLP  
DYEYIAGIRRRRNGERSRTS

40

<SEQ ID No.:1144;PRT;Methanopyrus kandleri>  
LALPGQIIAFITLFSILFSIIVITPPLLVLARGLARREARCRRETLDHVLRSYPILIPP  
GLSMVSSYIVFLISILVECGVCIVTKEKHLHFLRLTAILIIVTITASLSLWLAAMTPYITIAK  
VLPSNHKIRIKLFTITYQPILIASFSENIHTNNIQLELKTGRGSELIKYSISKRTERLLRTL  
STLDGVERVNFYLGVLKPGSSIIIEVKHNPENGNIVSVITPGITLTTSQSNTNLDKVYNF  
DALATVTLPLLLGRNSYSTLRDIEEKTNVSLDRISLLEWLVFAVVGSKGVSLESSH  
RIVKSNGLMLLSSLHPAFTPIIVYVLSLVIVYIICITILKASSDPLHAILFYVIVPQLASVA  
VSTGISLVISPITSKRKVLDLLTEVMYLYKARRG

50

<SEQ ID No.:1145;PRT;Methanopyrus kandleri>

- LIEVLTVLLAHDPTLMDPCTHGLEVVVTGVRGAGRVGGGREETGGVGKGVGGGGR  
GGKVGGGGKTVHPSELLTKPKWRFLRET LGGKVKARRAHAFRWLTRYHPLRSY  
YLSSLATAFTGLCVGLLAVPLATRARRWRPETVAFAAIALIVTVSTLCWEAFLGYLAS  
CQFLARVTEGDAHLALSEFRTWGITGVGYLLAVYAVLASLLACAAWRKLGGRASLR  
5 LAPLLVLPFLTGLWFIRLGLAVA
- <SEQ ID No.:1146;PRT;Methanopyrus kandleri>  
LMLCLTVSSALPAALT LGFIGFPRMRGDRRRLSIALLSLGYCEAELITDGEVEVSRFR  
ELSSYPVRYGEAPGGQPSNLRIRVGYFRPGPCKVEVRDCGFLFLRTRGVCVLHDA  
10 QGLLKDREKAFHLLRWWEKFSMVYAALCLEKEESPEPEEVDGLLGSVNNRAGW  
NELVYLNRRFSLTDVLRHYEVAVSMLGTGVCCLVTPAWVKLIGVKPSLKLHTWWY  
LAPAILIPPVSALGVFVINLDTALRSWRLVREGRVYESVLGRDPYDGKWKWLSR  
DGDPIASRHRESESEDEPQSG
- 15 <SEQ ID No.:1147;PRT;Methanopyrus kandleri>  
VRAWLLRVQAPPQRIEKLVLDRPPRARVWLLGLTYRVGREYHALLEPGKSELLC  
ELKVRVKLDDQAI DLTEPSLLLIHTTRGDLEYSVIDLRNPVLPPEWKRAAPPVNEITVEY  
GPKALRTIKLESEFYLVVLC LPPGFEYSPEDFTKWAQALAGLKDEVK
- 20 <SEQ ID No.:1148;PRT;Methanopyrus kandleri>  
LRVASVIIWLLWISPPASGYVCWSVPVGESVTSVESC GDAAVLVTSSNRVLVAELDA  
SSVRLSEVLNFHLP SGTKVVSVMRSGLGLVFDAGRILDDGIEVYRGVLTHGDRGWR  
GELVRTVAKFEEISQRVKSGEWRVLEVSNLASDRTGGLYAAALLESVDGLIVEVW  
NLPERSVIADFSATEVRRLAIGDEG TLLVACGDGVAVVDGRNVRFVTPGVVIDMV  
25 GRWVLYEDWLGYALGEVTT SGLRELVR LPGAHRVTWSTGGDAYILAYG GNIVY  
VDPEDRTVVTVLDLPGRVEFLAPPFVYSGKIGVLYLAKIMVQLEEG LCPAVKTWF  
VWLDWCAVYIVDRKVPAIYKVVEVRDKLGPNIWIKTRSGGVTFWYKRVFLKRWPR  
HPTHELHDDIGIVIGERN SKIRVYCLDERTEEV LKNLLRSPDVCILNVYPGSAVFIV  
DFKWRDQRIPAFRFVRKSGWLVTGFIDEDDVCPNSDYDDVLSVPISPLTAAHSGM  
30 PVIPLLYGKDWVLLSALLPNFDWCWDK TSELKVFNKGKESFYVDW SNKTIRGPF  
TKLKLKIGKDKQLFILLRGLSEPE SIRIVLKRPLGPVYEGYTEYAPPKVSISRPSARLV  
EYNAKEDKVTVAVSAEVSVRNTVIRRLTIEVFDLFGRTLTRKVMG LPPGKHIEKRL  
SFMPPHEHGPLKIILLAEYDGD LVIVSDREFVLRAEPERAELTVSYERPGRLTARVLDY  
GRDWVELRVESEEPGNLHLED SKGRPVPIYVLEGNELSGPYDGEHPLELG TTPVIL  
35 ILRDLKPGEAYRFKLIREGRIPTAFELECALPEANLDVELLSGTLEGRSLTLKFSVRGS  
TVNSTFKRLNLVLREDDRILWREEVDLDNTTWFDLPFETTVEVGGDEGTLTLEVTAH  
YDHDTVLPEGNEFEVREAPARRVLRIAYGRPHVELEDYGLNWLLL RILPWRPGDLL  
VRVNGKPVITYYVKHGN EF EKHS EDDPYHASGANAVEVLLYDLEKHGTITVINRSSTL  
SSASTLDYALPEGVELAAEVVGGRYLVDEGR LTLNVRTLVSPIDVTVRRIIARVDDL  
40 GEILGETVKTVELGPGIHELTLPIEVRVHRECGRLRLQALAEFDHGTIVRDPGEGPVP  
NPASRTIEFSYSAPSVRVVD RGIDWVLEVT TREGGELVHVNGRKAWYYLKR SRG  
GDWEGPYDPTSVGP NR TVLVPGVPPEGRISVVLGGR LERVRSVEYALPSVIARV  
DVEDVSVSGEKVIAMISLWLEV LGTTVRSIGVSVDGVKSWSVSALEDGEPLRLDDLE  
LGEGVHLVRLSIKFVPKERAGTVPVTLRVQYEGDSTFDPGRREFVESPLVLT LNPVY  
45 VLPQRQTSKESGPRGGSPKVP ERGGTAVDRGSTTAGESGTGRSAVTEPTHASTR  
VERRPSNEERPHVVRPTPPTRFPIRPVRTETGHEVKPKPLEKLPEALPHPSSSLPDT  
LEARLTPVLVSLFDRLWDL L TSLLSQPTITGHAEGEPTAKVTRRPIEHAPSEPSRPT  
PTGSAALQGPPHGTTPVQGYHRVGALSAHAPHTFREVEILKTRTRGYAYAEGTSRV  
50 SRSLTRLPP TGVNLLALLLSVFGALTGLYLTHRSVRGGEGGE
- <SEQ ID No.:1149;PRT;Methanopyrus kandleri>

- VSRLLPVVLFLALVSVVPVGVQAQSFKWVEVEPSVHTFLGASVYLVDNEHKALYS  
LGEYSTVMEKSKQQTQPRPLYPKDRSEPLGELDLDALGVAVSCWFGGVCSSDDR  
TMRTLLQVLEMDDEVRARVLGNVCPTLTMFGNVPVHVTECRVERTENTLTFKFTHY  
GITVRIVKSELKVQVTDYGRDWLLLHVEPPSSGKLSIEENGETLAFHTLTSDGTLSGP  
5 YTVLEVEEGRPLDLVVKDLEPGEKSALDVVLEDDLGITVRKRVEYALPLVNIESLTV  
PGNPLRVKLRLSVKNTMVKRITVRVVDCTTGGVLTERAFDVGLSEGEHELEYSIETP  
NTTDPLAVFAAIEYDHGTTLEGEKFEPVETPAQDFTTIVPSTGTPEVMLDVETPERA  
HLGLPVENTVHVRLGRIPLSTGEIRVTTEDGKTLARTTVSNGEARMILPHTHTGDVEL  
HIEYYLGSRKLAERELTLHVSNEFHGFTADIVSPGNLGSGLGYDLRGSYIPERKYP  
10 DEPMYIYRTWWDEYYPFLVQPADRPNALLANGLKITLPEPADTVYMLTLPVRVHYP  
IRVTIEDSSGERVTRKLWWLNWDWQWWWDHGWVSVYHLRLTARDLGLKDITELEF  
DVPNGLLWILALTYRSGDAYKALIEPGKGVTLTYREPGPVEIELEGWPAGSDHEVW  
RKVGDEWIPFYLCPKDHNPALPADHLLLHIPHDADRAYILLYAREDTTAEYGILT  
TVPLELPWKSNVPRSDDFDHLAVLEIPCKPSSLARSRGRVLLVNAPNAYVIAITYHLG  
15 DKYEAHAPDGEKITLTSKDLPHYHNANILRETIDSEEHLPELWHEGVAYHWLPVP  
GTVLHVQIPFYLAPKDAENAIKVENDLKIQLPEGTKAVYLLYIATDQRPDKDRPASKY  
HLEITLDDGRTVQAIVLLPDYALTRDPSTALLAMDYARTNPTGLILITQRPWAHLPLV  
LKDDQPEEAHAYAWVLTATGEEHTIRELTLPHPETGRLYLLAITAQAKDARLYAVLG  
PGQWVELSPPGEVWHGHTVDVHPGETREQLPIEAWHRRVLVKTPEAIPLLAR  
20 PDGPNATPIATRESTLNIILPKPADAVYLLYLATDYEEASTPPTPLALLDDGKLTGT  
LVRIAPADRKPSDLLPALAWAEPLVEEGEDLTVRQAPVITWDRVYKPTGTVVLEGRT  
AWLLELKPEHGRIKALTFLPTDTRLTVYLLAVTLRIGDYYYALEGGKTIRPLDAGEAD  
TTIETAWKPERAPELPRTFSWPGFSVDPAEKPYDYRHHVRVLEDEVITLGDEPVP  
VRLTGRLAPVVRREVELPEPADAVYLLYLTHAPSTSPARLLVEYEDGGRALVLVNL  
25 ASEVGLYESPARTVSAWVRPVLGWHNGAPTVVQQPALELERDDGKRVRAWFLKV  
QAPPQGRIKKLVLLDRPPRARAWLLGLTYRVGSEYYALLEPGKGELDELKVRVKL  
GDQAIDLTEPSLLIHTTREDLEYSIIDLRNPVLPPEWKRAPVSEVTVEYGPRIILRTV  
KLEGESYLAVLCLPPGFEYSPEDFTKWAQALAEKDRVKQDEKDEKLALVLTSSLP  
ILEAYYYDQVSKLCEDYKASWVRILPGVIIAQVTIEKRSDNKVRLGLSLDTPTVLLGV  
30 EFYADPVTQRALNTRASILTQVIENYVSKITGEPYSEEWALLPDNVRQDLEKILK  
ELGVEPHGETNKQSSIQELIEGEIPEYNPTTGTEIEVEKKKGAVGVALWLSTWLSLI  
DVASSPPHEWWEWFLGLSMGVIGWLGTIIGFAIISIGISIFIWYREYGSTPSPF  
GWASLAISIGSTIKDIMKML
- 35 <SEQ ID No.:1150;PRT;Methanopyrus kandleri>  
MIYYNDATGSALGGVLM SVRTVSLTLLLIAPVAADIPPHASEKELEDPNWWWWEHH  
RGPVWATRYPEVWNKIVLKYEDPEDREKVSKLGEALRHPPRGFELWWFILGMALV  
LPPASRVGFLKFFKYKTWEAPEWLIQYCGTIILSMAYLAIAMGRAYVLNCSVYYVMI  
GKLSEAYRTFYLWTAYAEPFLAFNAIPLILVSKLELPYRRLKAGILIAWLASLVNLV  
40 HMHSESLTLLSTLGG
- <SEQ ID No.:1151;PRT;Methanopyrus kandleri>  
LGHSVVLALSIIFFVALCPCHAGSWSVDPEIVEHPWLWNRYVVS KYHDPVERSKVV  
GLREELLDYRKARVTVFLCTGVWVIGIALLLVKNRRAPKEALTEHFFRLASPLGFA  
45 GLAIVIASIGEFNALLASKGEGYRVAVETIRAYGVYGPVIALLAIVILVTVSRRAPK  
VDLPFLPKTGLPLSRVSAIIAWTSVLLTSALIISYTVELFSR
- <SEQ ID No.:1152;PRT;Methanopyrus kandleri>  
VIVVITA AISLPKASHATLAATEFLILILALS AVNYVLLPLLGF GAWVFRV GKRLYL  
50 SLGYCEGETILEPGVEVELSGFQVLA EFPLESEYHGRLWIRIGYFPPGIHWVELPER  
GFFFLRTRGV CALRDPYLP RDDEGALEMARFLEKLSMVYAAVCL EGGPNPGRAR  
KIMKHVKNN SRWGTTVRYFGVKVPLGRFTTSQSTTVTVAVLVALSLSV SALARGEPL

GPMGAPILVLSWLLACVLLALPVAWRNRRRAVKTGRWYRVIFERHRVEEAIDKARDW  
NWFPDLERVDPLED

5 <SEQ ID No.:1153;PRT;Methanopyrus kandleri>  
LGRVVRGLLMAAYVGLSLAITWPFARFFRWCAPYAPAAYTVSELVMMVGTGILR  
SAIPLAAVWGVDVLNVAVVAICASYIPFCVCWVIFRVYLHCCGTALPDGGSMTVLG  
AVLLSTTSFQVLWRPEGRGCSCTVRWTSAGT

10 <SEQ ID No.:1154;PRT;Methanopyrus kandleri>  
LRGLTRFAERRLRWYRRAYWTLCPAVVLTGLGWEEAGLLLMGFAAFAGAFYGIY  
REETEGTFPRSEHSRRVGRTLMWYPTASFDRVLGGLTPTTFLPLFPALLYFITSVAR  
HPDFLHSRIAVALFFLGPLPVLLYLVRVEVASALGCVRLRVGRSRALLLSLGYCEAE  
LVTGDNVGVSGFRELGSYPVEYGGPGLRIRVGYFPPGKHEVEVRDCDFL  
FLRTRGVCMLYDSRGLPEDREGAFHLARWWEKFSMAYAAALCLKEGGPPDPGEAE  
15 ALAAGAGDNARRALTVTYFGVKFPVGKLVASEEAMLGVVLGMIPIATLVRDLLPPDL  
SLLSAPIAAPLAGVLLALPIAWRNRRVVRTGRWYRLLLRGDHVEKLLPRLLEDLWS  
RRGGMITTLWKVFDVLERERRQHPPY

20 <SEQ ID No.:1155;PRT;Methanopyrus kandleri>  
MRTSTPDDRKLDRCTAEVGVLSVLGRIVVSHRLLSLGSDDRDYLRYLRCALISDLV  
ACVSLLGVLEIYAFSLTVSPAIPVAIPAILLAGMTYLLKTLLESSPLAGVDRITYHM  
CILSAGTCDPVISMQLQPPGDLMDIPPYAFGLVYGLTVLAPIILLFGTLMAGAVLEPF  
EYPLEDSPIPLILVADIVRPFTLCTVILDVLSEVLSAVLLPGEVVRKAVAALGRSVMS  
LLGIGPSGEGARAEPAGGSGAPRASLNAHRYSLWNPLQITL

25 <SEQ ID No.:1156;PRT;Methanopyrus kandleri>  
VGCLPTVLAALAAIFVGGVATATDDTYPHHYVKFRIEPIQSVSEVPSEVVAEGGTA  
EVPVKVTVTWTGNYPCTIKRTPTRMTFAVDGNVNTQMITPPYKVGDTRTVSTTLR  
LTPGEHEITVTVRFPNLCSTGSPVEPTRRASGSS

30 <SEQ ID No.:1157;PRT;Methanopyrus kandleri>  
LVTSHVPIPHDPVERIRALRVLREVYRRRKPSLEVITYRTVNGSTCGPYVARWRR  
DSKFEHGRTLYLGKPENESVSFVEWLVSLEEVLELARHLMRNLRSVLKTLTEV  
SDLPYKRARRVLARGLALTFDARPSDSPRIRDVLEKLPDRLESFLIRALGSWPAHYS  
35 SHLRKVIRSRRESLDGKHEIPDVEFELERWKL RHGRRE

40 <SEQ ID No.:1158;PRT;Methanopyrus kandleri>  
LGDPGASGCCELPLVSRETVSRLRLAYGALCTLSAPLGLLGSDAGVMVAGLGSIVGV  
LLGLMRPFSFRERAPKPEHARIGTRLLYPTASFNRLRDGPKLGTALPLAMIPALILFF  
TMWLSTGDRTGVALTVFLLISIAATTVFSYLVKLSAAMTLGYALPVRVKPEGTRVSLA  
SLGYCEAELVTDGNVGVSGFRELGSYPVEYGGPGLRIRVGYFPPGKHEV  
EVRDCDFLFLRTRGVCMLYDSRGLPEDREGAFHLARWWEKFSMAYAAALCLREGV  
PGAVELERWLERVRNNRAVGFLVRYMNCDFNLPVVMCVLVL SLLPMTAEVDFVL  
TRGVRGWGALDAMVVLDAFTLCLLALPVL CGLLLNRRRAVRSGRVYECLLEGEPPHR  
45 RLLSTLCVYNPSK

50 <SEQ ID No.:1159;PRT;Methanopyrus kandleri>  
LVCGDPRLREIVLEFRDSVRVGSSRVGGVLRKLYPILSLYVILSLVFEGRGVVRVLW  
DRASAPLAMIVIAGACIAPILAAYLAFHGYLTLEARRRLRAPVVT RPHNPTLLLLPFL  
ALLRPDYYVHHWPETRV ALAYLYAGCALSPTLALAVMWVLRTRVWVCWKRDLEE  
VLERFVEGLPDGRYVPGSLIPYASNVGT LAVAIAVDAPSLTPYLITAGTSLVALTTYI  
STFTEGDLLDILGKLRS GPWRDDSYVIGFTILILERSFWLIEHSHP



- 5 <SEQ ID No.:1160;PRT;Methanopyrus kandleri>  
VGIRGSRGVVSEFEGSLKREPDRWWFTRFLHEHPMLLSTSLALLTLPVLTAGRTV  
WELSDRPHDPAALLVTTSATLAPALAVYSALMAYYTLRARYLIRAPVVTYPHHPAYL  
PLLYWLPSSRLLTHWGEPKVRLGFVVLYTTVLLPTLSLLLTWICRVRLWCWRGDI  
DEGTLARLLERLPRDYTYAPGCVFPALVAISALPGAFGYLLKGTWSGWYVLAIPAS  
MIVPMTVLTAVIRKMSRSPVEELTDEWLGEKNAPWRDLQALAILATFATWTLVDV  
GGMR
- 10 <SEQ ID No.:1161;PRT;Methanopyrus kandleri>  
VFSARQLTQPLHVLPSIILMYLPVIPSIPHAELTDSSVFLTFLMIVLGVVFFVVSISMFLSF  
PFAMILRVKDSRVWILSWLYCETELITDGSIEVSGFREFTSYPVEYEDLPAGSPRDL  
MVLIGYFKPELHRIEIRDCNFFFLRTRSFCLLYDACLPGDREEAFRLARWVERFSMV  
YEALFEDEIPDEKNIMKYLDGLYQFKAHHYVPLPRWPYDEDRDARD
- 15 <SEQ ID No.:1162;PRT;Methanopyrus kandleri>  
VIPGWYVGAVLVPQLVVTVVIAHGFSRKRRWERLLRRASREEVRRSLERTPGGGTV  
RLAFVPELLWCVPGRVLVLGSTGWLMLAVLYEFELLGLTRIVPEAKVRGLLAVALAL  
VYGTCAVAVLPGTTPRALPRLLAPAAVGGALGAVAVLKSLLPPWLGLSLAPVAMLVGL  
20 SSVIGYRGRLSASGGTAWDEVVEAVRYYPVSALSVEREAEAAEKALWFLACRV  
VEGTRSVG
- 25 <SEQ ID No.:1163;PRT;Methanopyrus kandleri>  
LVESHAVPIPSDPVERIRALRVLREVYSRGKRPSLEVITYRTVNGSTCGPYVVARW  
RRDSRHKCGRTLYLGKPENESVRFVEWLVS LNRAEVLELARHLMRNLSVLKTLT  
EVSSLPYKQARRVLARGLALTFNARPSNSPQIRDLLEELPDRLESFAVRTLGGWPA  
HYSAHLNKIIRFRKRSLDGKHEVPDVMLELERWKL RHGT
- 30 <SEQ ID No.:1164;PRT;Methanopyrus kandleri>  
VPVAYFDGKPAVKIRFARVNAPEIYHPSSEEEYRLGLKAKEFVEKKIRDAGGYVKCR  
AYGLGKYHRIIADVYPDDEETTLSELLVERKLAERYQYPEPDPLPRWFPREFKAHVA  
KVVDGDTIYVYARNGEEGPVPFEEKESMRGTVVGEYKTGTPTVPVALAVISAVIGVG  
LLVSARR
- 35 <SEQ ID No.:1165;PRT;Methanopyrus kandleri>  
LATIRFVVDGIVVEGNNGRLEFDPKTTLMKGDAASLAGFLVWLDGLFEAGVRLVRR  
MAEGVEPVVPEGAEPWVEPPLTLPVSGEYSRVELKGLIAGIVESTKDPWTVASRAA  
RITEYLSDKGAVRILHGSDPYDVAVGV LALKDGAVRGTLTVRSTVETIAEGARDLI  
REDEGRADEVISGIVGNVLLRLGYAVNVRVTDRDGRVHIVRDPSTHADRVAVGVP  
40 LTGEVLYGTLVPAAEVGLRCLERRDWVNIIAERIRRLGLRTVSGSQVVTIDGETLR  
GDELEESATEILEEGDVERGSRLEPSEPSG
- 45 <SEQ ID No.:1166;PRT;Methanopyrus kandleri>  
MAAPLKAGVGVS KSSPEEALEGAADWGLDRIDAVLCAFSPRHDPHEVREAVEYLE  
DDRCLILGLSSAGNITTDGFS DGSVAILAMELSKLVAMGMAIGTGLSEDPYRVARET  
VTEAAKSVEVDVSASLAPVATKLV TGNVDVTRHSLVDALLFTDDLCCLNHPEALMEA  
LRGVLDCGLTVPRIVGGMTADEYEFERTYIFDDSGVYEDALAVLILYSSVKRGHVD  
HGFVLSSEP MIVETEGVDVIRMDGEPALDVYEEVVGEEIGMETLLKYPLGVEDPGP  
RPYHLIRTPFEVDEEERTLKLVAQLPSGVAVRVMEPGDVEDSFKRAVQRALEDAGS  
50 PDELGAVLVFNCMARHLIVDTDDAVDLLRDLVSEDVPIFGFNCYGEYGLTPSGKFVQ  
HNQTVVTYVLGSEVVGR

- <SEQ ID No.:1167;PRT;Methanopyrus kandleri>  
VGARSSSVGSYPTDRDPAVREGAAGDRGGAPGGVRGPESVGRGPDAVWNVSDL  
VVEALWSSGLVYVDVSGARGPEIAGIPLGLAALEVPGLSVGGGREVRFVAGRLEDD  
VLTDTVTEHFGAAGALIWTIICSWKPSPEAARRAIEPAERAGVDVRELDRLGEYVDAL  
5 DTAQVGEVLGTRPDRETIRTIVRILRRVLHRVYATDGRFAPPTASPLSGIIRVHSDT  
PTPTTCGAVTSPREPGT
- <SEQ ID No.:1168;PRT;Methanopyrus kandleri>  
LRVGIAVLAALLATLGAATAAEYPIKGEVTGTFEVHVEADPGTQVDTNEYAVVVGSK  
10 YVYLIMVEEDDLQDSGKFKTQPFVLPVPADKVEVNGSLVKFPDGLDDTFAAYCLNP  
MGRHPRGEMVVPKWNEIEDRFVEIKVAGHGQVRTEERHLAPEWIKAVCKRVEGV  
VDPGEWKRDQAQTIIWVTEAAVPEENVQVNVENRVQIDVNATVQVNAQDFFQINESEL  
RELANAGDEMARQLLEFFSNKEELENLVNTAQSAALDFVKQHLSDIVTTAQTAKEAYE  
TAKSVFGKIPVSPAVIIVALAALAIFRRRP  
15
- <SEQ ID No.:1169;PRT;Methanopyrus kandleri>  
MTSLESELREALRERRLRKKWAVVAVVYLAWKMYGKHVSAGDIRDVLESVGYEISE  
HAVHAYMSGLRGLIGRRKAGRRTLYTVRNEEEMRRRLRDALRGSVGRISSEEKEAL  
IESILGGDRGRRDPEVENLVLIIWRRPTAEYRRRIASSVHPGSRLREIPGVFGTFEGI  
20 WGFSGSERVGWESLGEEDVLLFRDEKGEDRYRYCGVIASKCNDPKVSAILWGDD  
RWERLVTLAEVRLVSLPASELNELLGYRAGFRPRGAMRVDPDRVSKLVERYGGVL  
EFLREYEE
- <SEQ ID No.:1170;PRT;Methanopyrus kandleri>  
25 VTEPLRPPELEDPKRVYVPVAGAGIATVCLYLILPRGLFPALLALAVTAILLGVGTLV  
FRRYLGNQVELTPDAVILKGGGTRIPVEDILDVEERESGVVLT KD LERVMPMPFD  
SDRLRHGLRILLAHKKGSPGDAVVEAVRELGELPILEVVGGTVFARWRWLRVPLYS  
PGDPRLEEFHDRVLEAWMECKGLGKKPPSPPEMVAVTAILPTVTPIAMRKGAKTSP  
SGRDYLGKLIHWILVKVAKALKVSLWAAATIAAAIYFGPGATVSAVYWAARRVDSVP  
30 VPKSRIKHATLTFLEYNALLTGLLAPVIGILYLPLRVHCPRLAIALALGAVATMAPSV  
RAVSHYRRDPVGYTAALLNDGILVPEVVLIGAGTSVLLLVLVGAVPAALTIVATFLFHA  
VIVLRRIERAAELSRRRAWKLRVSRDGTGGNIPHTGGS
- <SEQ ID No.:1171;PRT;Methanopyrus kandleri>  
35 METSRVRFLRYRTHLLTYVIVAYLWDPKHALAAALGSLLPDL DHPSSVASRALVPL  
EKATLLPLRRLINTVVGHRGILHWPVPWALGAFLAWWVGHTGLAAVLLGGCLHCLE  
DALTVRGVPLLVRDGGGRWRVWNLRLTPVPSDKWDAVLPPATVLLLCLVILACPSE  
FHTLGLDRIPGLEKVYWTIHERVYHRLHPFDAYVGTFAREILRLEPMAAFAPC
- <SEQ ID No.:1172;PRT;Methanopyrus kandleri>  
40 LVAHRGRLFVETDGKLLGSCEASLIVTEENVVVVPREPIEGVDTSDLVVESVASRFD  
SAELEEGNFTPPRSRVMTPTAASMIDLGLALKRFEVDGVTVLT VVGPA PAYPFE  
RRILAPEGEMTLRFEPKDPVAAEGSLRAAARA AVEGTVGETVGRSKAVRLCKVLVE  
LNQTVGHGTLRLVPRDENVLLVLQPEEDIAEEFKDAVGKSIQIGIALTPPELSAVFSGK  
45 AVVKHGKEDTVHVL DARTIEFRAEGKGWALRAVPTDVIAGSTARVLLRTAAELIVH  
EGLRPE
- <SEQ ID No.:1173;PRT;Methanopyrus kandleri>  
MRSFPLL PVALVLLPAAAHAGKISVTVPESVNVQGNALGIHERLEKELDLIVTVTDL  
50 GTGAVYDMKFNPLEPSSPAGLDVTGPVTVIATVRYARNIVTRFNWPEGASSFSSV  
DVPEGRLETTVNHPRISVPSTGTDFDVECPITMSLR TDKGT VTKLLLHVSGIDVKGV

KAERKGVLPPELPSVVRILPVAVALAPMVVIPGFILIDLTLNVNLGLKSTLGPVLDHFLG  
VLGGLLPRPG

- 5 <SEQ ID No.:1174;PRT;Methanopyrus kandleri>  
VELHERHLAPSTTGPTLYGVPIPVLIAMPFYLAAGVGRGV LALKWAWRAGNTVRTA  
SIVASFAVLTLLYLSVPTVTVAAILLLVSTVLFYLFNTFIPRYDRFYVEYRRRWGYDEA  
PKHEVLELARECRLDVLPPALKLLNGTAYLAAYNERDNPNGWDPIDRFHRLLLAFEE  
GSWKGGYVGPNAWRIVRGVAELSLDHPEVELARRLEE
- 10 <SEQ ID No.:1175;PRT;Methanopyrus kandleri>  
MSVISKDPGTITVVRVDDEALSKAYSADK GARITDWFGPVELSPGSHDVGIHL YLD  
GQEV RWYGSVVKVMSGREHVRDHDEYEH HREEHDHGGTTRINPRRSDFPPSGSR  
SRGPRDHPNSR
- 15 <SEQ ID No.:1176;PRT;Methanopyrus kandleri>  
VSVPKYLP LLI AVVATASPGYLGVEAFVTGISADHVDVVMVYADSDDVT KSHRV  
TLYLPPEATIKGVKSYQLPRREGD VDVYGGQDWKPETGTWSETARSDPRSSFPK  
RPPMSSTCT
- 20 <SEQ ID No.:1177;PRT;Methanopyrus kandleri>  
VLRAIAVVISALVLA VPALAE PQADLRALGEKIGNDALTTLGATAGDPKLLVITDARAV  
WVDSGDGTPDTPAAAVADAVASETGCKIGENLVFVQSKPASDLFVAVFYGDESS  
GKLVFYRVTHSLLDRIARGEVSVD SLTFTSDPSDENG IYRYVLGDLTAENVFRELLS  
AAGIDPSGYMTDGRIDLQKLDEHGWDGFD PDKYTDEALQSFNDKYFGKMC GFGFT  
25 VLSIALSWANGLPRRYLASVERHDHLC PGLISGMLIVDKLLREGKAEAVRFYVACPI  
WCKDDAIYTTLDLTQGKR NHFV FHPDSRERDLLNRKLGGSPAGVFVLQEGEDLKAL  
VATFKWVNWGA VFGKLARAGWGSVKGRVLNSMIRIICDVVFCRDWNVDRVGLKEY  
PMTCTEAAAICAGRDPY MV LGLVAPYTD DPKVAAVEQALLYARKVLGLSYGDERAY  
VITNVTY LKDFVDGRVRNVITRTLGLD ATFSGSNR SIQVTTLEDRIEFHTDETADPVI  
30 AVVNAETGEGVAVVLDLAKLEGKRAEDILTMDPEEFVKEYAKAYTDKVKMNAFEISD  
EDNDKLSRLGRYAFNVVTLATAV VNGVPKDLLRCAAWHNHFCPGVTSGWMI AKYI  
QEEILAKEPLKDNERLVWIGVPVWCKEDAVQTLLDLTPGKRGEFVMQLPREVQEEL  
KREYGIDVAGILIRYQYTGKGKDEQILGGKAYVIGFDWDKANEIRPNVQYFGHAAWA  
VELAKRDPREFVRVIKEISLGAEDVKKLTEDTARVNP LEVVGVIHNPKPKRKP P VYW  
35 VTVALALTLLVFRRLPKPS
- <SEQ ID No.:1178;PRT;Methanopyrus kandleri>  
VLAALILVTTLP TPAHADIGYVGYDPEDAAHWSGVGLLQHPYVAWRSGGYKTATL  
ADGKLLLGTDSGRDDALVEVDPATGHVLR RYSLEFDPGDCSYSVPLVAHTREGTW  
40 VIKAYRTTKDERNVGAILAINIGDGATRYLV DADLGPYEVEETRVPTVFPVACLDVDG  
DGDEEVIVEAPSGMFCYDVTPEL KRLWWFKCEPVHLPDGVSLPAILDL DGSRLLV  
LDVRDGV PVLHADVGTGEERWSIDL TQHGVP RVKGYRSVWKVMTGDLDGDGKP  
ELVVTLPGAQRSVQSCGLATKGSGESYL VLRPRTDGADPVTVLKISDVYPLNSGF  
GHPAALGDIDGDGKDELITFFTDRLRVFKLHGDRLEQVAEVKPGVTVFWSSVCLIDL  
45 TGDGRPEVLLSGNPGRTVALRYDHGQLYVLWEVPYPAQVNL PVPVDSDRDGKVD T  
LVLYSTEHGIVALKAGRTAPTRGEKSEGKRRRLPLIPVPPIPRRRRRLFVATLVAVTM  
AAPVTATVPLYCEDRADPSTVQALKSEVHRQIVDAVHWLAEQEKPTEFETEFYFPGW  
YYDPNPTGEPRRFSAMDTAWVLFGLAH CYKAGIERDLCELIKKG LTALEACQDDE  
GLIHDVPVKSLGAGSFTLGC AVPTAPSSEEEA QQLKEWVG FYTSQSLPGIVAVYRL  
50 VDDPEVKERAKRIAYRAIEAMFKHYWREEVTTPEGTVEIGYFQIQGPGAWSDRTR  
TTPLVLWAILWSGYRSWNDREVQLMWNLLR FTEKERTVRGIPVAHVGD IKIDCDSW  
TLCALAAVGNTVDSGPLSDLVRKLVNCI MAHTKPTRGGLMAVACHFGELEEEPGKA

FLAHKAARAYYGLLQAGVPPDNRLVTEIVRFCLKAHRIDPNEKDPVTGLQGTYKDDV  
PYWCWTDVWKNDRGLKCFCTGITLAYLAEWYSLVEGNEPSCRSKTERHRVPV  
TPVILPLCPRRARRD

5 <SEQ ID No.:1179;PRT;Methanopyrus kandleri>  
LEIEVTEGSFVSEVYHWLRKEGLPAVAQVRIPGVRGRVDLLVMDRRPVVVEVGFP  
VEITDEDLRRALRYVRAIIEWNSDVEPAIIVTNLKEAWYRDDPLGEWEKEELEDPTS  
DLIVLVRRLARAEIETEEQKGPEETEDTDRMLP

10 <SEQ ID No.:1180;PRT;Methanopyrus kandleri>  
LNQGPTVLRWQRPPTCVPEPHRLTLRNIATIHDPRLISGTISRVLGAESGAQG  
WIYGKKAIGWRERSAELELATLNNPTFGVGRKAEEDVEWEHWIVFHSVPVKVRI  
GDVELPTEEPLTVKSIEVDCDSKLMKINFKDDARSLMRLEGDDHSHWELKKCSANV  
KFNMSPKVEDEEVKCIYEIRAEKENFSLKTIDNVIEYLQEKEVFSCEKIWEKPEKAKS  
15 KSRVSKYIEILVEVELSNFIDKVSVDVYRLNGKKKFKVVD AELLVVLNKDKVKKEL  
LERLYGVSGDIDFADEVLFLLTFAPHARFKSSTS

<SEQ ID No.:1181;PRT;Methanopyrus kandleri>  
LVEWREVPVLPKNTFFKKLNAAIAWIDPFDEFANPDVKELLAGVSELDPNPLLHWS  
20 NVLSAEHPPEEWRIPIYELAEYMVCFNKAGAAVLRYFADALRNVFERPSLDRLVRPL  
AIEMALSDGDELPGVLRSELGIEKGYRGLGKGLPDALRPSRWLLSVVSHACSNRK  
ARPEEIAEEFEHLGFELEGPEVIDRLRENVEEAVEDLVTWASREGEDPKPYVEVFR  
EAVTATLRRSIRLVRRPEEIAKSLKVDPTVSIGGVKIGPEDYDPLWVRVQVDVEE  
VTAEIVDELDELTRR

25 <SEQ ID No.:1182;PRT;Methanopyrus kandleri>  
VLQALAFVLLTIAPAAVHAGQVTNVALDDMVSNGAELGTYDTLVSKLTLDVAVTD  
VGTGTTHTAEFKLSEVPKSVTFEGIRGPVTVSVTLKYDGKTALAATLFPDWPCSSAT  
VDPDGMQLQARVGCVSQYVADTEFSTECVAAELYPGLHSTEIPEDARYVLAKFN  
30 KVKAEGLAHGGSRARIHLDDVLDTAMD LAELVLKYMPPILIVAPVLVFIGPTAVEMFA  
EFLKAILVAL

<SEQ ID No.:1183;PRT;Methanopyrus kandleri>  
MEIRKLRVAVQLISAGVAAVGVAFLKVVVPGIAAGCAGIIDTGTMLLALPVVAAGLV  
35 TLTQLAAVALVGWVVPAILVGGAVCGWICPLVLVQDALAGLGRKLGLTVHRPPGHG  
VLLYLRYVILAATLVLGPFAAYKLWYKICPMHYLSYILLGRQEIGLYSVLKMSAAFIL  
GASVFVPRFVCRYICPVGVLLRLANGWSLLDPLLKGKTEIVRKGCKGCKVCTVCPK  
ALDPADAFPNDFDCMRCGRCLDCPIHLKMVGEG

40 <SEQ ID No.:1184;PRT;Methanopyrus kandleri>  
MLGTLGFRAAVMAAILAYILTVPSHLGGVGKSVEDIAKEAIGGGDKGSAGEKDEEVS  
EKGGEKGEKSGGERRPEEGSSGSTGGGSSGGNGTYAGSSSSGGGT VTTGSS  
SGSSGGFVCTGNCAACPNPCH

45 <SEQ ID No.:1185;PRT;Methanopyrus kandleri>  
VRILTLLVAALTVLGAVSATTYICPVTGRYFDDSTARGQHCGAFVDKNGDGYCDNL  
QVLSEETSDSSAETTSTSSTNTSEQQSSTASTTSSTTSSTAPVGLVAVIAGLVAAV  
LLRRL

50 <SEQ ID No.:1186;PRT;Methanopyrus kandleri>  
VSEAEVLRELIEELRALRHEIYMLRMELERLRGEVEEVESEDDIPDLLRAERAEM  
AVGDIDLELESDEEGRWSLL

- <SEQ ID No.:1187;PRT;Methanopyrus kandleri>  
LESYRTLLAVLLMGLLFPSSWVVGKVRVESTGMPFATYYQNVKMSEVLQKRPRVLV  
LDPWCGPNGRPWTKEELRKIKDAGVKPIAYLPVCVVAEYHPNLYREARRRNLLGAD  
5 DPEWPGDYAVKFWEPAWRDVLRSELARLKD LGFEGVFLDVVDAHSRDWYVRWY  
DRVNPBGDLRRDELNAVKWIAQTAHGLGLRVVNAGAWAFEGDGMARLQSR LGF  
AVTVESVLSDGSRRLYSRSELESNLRTL SRFQGPVYVIEYGLDPDDPSVRRAAEKL F  
DKTRATCVYITSVKHDGIGVALVPLRRWLWDVT LGPLLGEPPSWIGGGR
- 10 <SEQ ID No.:1188;PRT;Methanopyrus kandleri>  
VSPHTSSAFGDPARFIIPRTGRPRPLPDGAPGTRVHPAGHRGTGRPSYSPLALSSA  
RAVTIFSDGAYPPPPRNTNLRSECTPDTSNSAVPVHPQTSSVTTRQRPSSRTYIRT V  
APGRASPVLASTTATYTRSLPAYQARILVGVFPA
- 15 <SEQ ID No.:1189;PRT;Methanopyrus kandleri>  
LTSAVVVEGLKKVYETETRGEIVALDGFDMEEVEGEIHGVLGRSGAGKSTLIRILRGV  
ERFDEGRVEVCGVELTPDSPKSRFTEVKRITAIHPQREFGLWPETAENVMRKLYW  
KRRGAEE LPPEDSSEYEEL YEEALEYL RIVGLEHKADHYAPVLSGGEKQRLLLARQL  
AKDPEVLLLDEPAAMACPGTKQQLLDAVRNANEEKGITVIVVSHL TEVIEYLCDSATL  
20 LEDGRDVLHGSPREAVDRLTRGMPEPERVPEPRDEIAVRVRDLEKRYALVRCGETL  
HMRGIELEVRRGEILAVVGP SGAGKT VLLRMIAGLELPDSGDIEVRVDGDWVSMTD  
LGHGRMEARRRIGIVHQEFGYVHHATVRDLLAGRLGVKSSTVLEQARRRAEELGLG  
EEALDVL YALTDLPREEAEAKL KELDLS PDILDELFPKFPSDEVERFARPVFEEDLP  
MEVLDMKFGELSGGQQVRVAIALELATEPEVLLLDEPFGDLDPVTLRSVANSIKRIV  
25 DREKIATVLVSHDVRFEETANRAVLVDDGEIVMEGDPKEVCREVERSEARFLEG
- <SEQ ID No.:1190;PRT;Methanopyrus kandleri>  
MHRYCHSDLIIPY GAGRSRITVRLPGPVHRW IQREHGSVAGYVRKCLEDELTRVM  
LRELADSGSGRRLSTSLELPEDLVRELDEVADRLGISRNELVTCLVREFLNEMTAR  
30 RTVRSDVVCVLRELLNVLEEGWKDLGGRRGGIEEGLRDRDAR
- <SEQ ID No.:1191;PRT;Methanopyrus kandleri>  
MAIPMHAIPSRVEGIELGPLGVEVEILRESHGLLYPWARLLSETSF AVIIAVLGW TYLR  
DRRTSYVLATTVGT LVTVVLKGLIGEP RP FVLHVVSPLTNPDEPYGSFPSGHTSR  
35 SFALAAAYHLERRDAL TAILWIWAALVGCSRVVLGVHWP HDVIGGALVGITVAVATH  
RTARLWVRFLSIVDPLARGVRAWRWYVR
- <SEQ ID No.:1192;PRT;Methanopyrus kandleri>  
LAMVREVIDFVEELAPPD LAEDWDNPGIQVCPPGG LDRKAERV LVALDATHALERA  
40 GDADVLVTHHPLLFRPPRRIGRWYRVLRAVLEADAVFYAAHTNLDRAEGGVADTL  
ARRLNLRVEREACDGFGR LCEVPGSEELLNALRNLSPLTTVYGDWEGVSRVLV  
PGAAPDGLVMECLRCGVDAVIAGEIKYHTRAEELLEEGIAVVELGHEYSELPGVQELA  
RRVREEFRDLNVEVPPPDITIIR
- 45 <SEQ ID No.:1193;PRT;Methanopyrus kandleri>  
LRTVGLERKILVIVGDGMADRAVPELDGKTPLQAADTPNMDRLAREGSVGLLDPIRP  
GVRPGSDTAHLTLLGYDPFEVYPGRGPLEALGAGVEVRPGDVAFR CNFATAEERN  
GELVVDRRAGRINEDEGTPKLAETINEEVDLPVEFEFKEAVGHR AVLVRGGDLSA  
DVTADAPKRVGKPKVDVKPTSDDPAAARTAEIVNEFVRKAYEVLKDHPVNRERERQ  
50 GKPPANVILPRGAGQLEEVFPFSDRYGMSGAVVAGASLIKIGRMLGMDVPEDEAI  
TGRKDTDLKRKAELALEALDDHDLVLVNFNAVDEAGHDGDARGKVEMIERMDREL

VGTLLEGIDPEETVVCLTADHSTPVAVG DHTADPVPVAIWTADARRDPVEEYDEISA  
ARGCLGRFSGLHLLNVLRDLADRIEKFGA

- 5 <SEQ ID No.:1194;PRT;Methanopyrus kandleri>  
MSITETLVAYFMDFERAMGLPGMLVITALECSVLPVPPEPFVFPFAMRMDPWVLA TL  
VTLSSIVGSL LGYAIGYFGGRPIAVRLVGEANLMRVESKLTEHRFSAWTAVFLAGLL  
QFIPFKPFTIGAGLVEMDLRLFITAVVTGRFSRFLFLGYVAQSETVRNWISYYLGPKA  
LKMLMSTG
- 10 <SEQ ID No.:1195;PRT;Methanopyrus kandleri>  
MVDVLIVLGSRSRDRVAEKA AKVLD RAGVDYNVRVASAHRTPERIDELIEEYEPDVK  
VYIAIAGLAAHLPGVIAAKTLKPVIAVPVEAKLCGLDALLSTVQMPPGVPVAVVGVD R  
GENAALLALQILALEDEDVRSFLEEYREEMKKQVARDDDTIKERFR
- 15 <SEQ ID No.:1196;PRT;Methanopyrus kandleri>  
VTLGERTGRGRSIAERSLERWTEKLGEPENLEDLLTLRLSHATWDPFVSETLMIEPS  
EEAVTEGLKSAEVVAADVGMVAAGIRRSVERLGLETVIASEVGERIPEDT VTGDGM  
RKILEDHRNVAVVGNAPTAAEKVAEYPESIAVAVLFPVGIGAMEAKRAAMDAGIPV  
VTNVSVRGGTPLAVAAFNALADCVTGNAP
- 20 <SEQ ID No.:1197;PRT;Methanopyrus kandleri>  
LRSGDIKEGVERTPHRALLRACGLTDEEMDRPFVAVVNTYSEVVPGHMHLDKVTEA  
VKAGIRMAGGVPFEVETIALCDGIAMNTPGMKYSLPSRELVADTIETVIEAHRFDG FV  
AIVSCDKMVP GALMAAARLDLPAAIVTGGPMEPGCVDGERVDLIDAFEAVGAYEEG  
25 EISEEELEEELEQRACPGPGSCAGMFTANTMACMTEVLGMSEFNCAATPATEAEKL  
RVAKLTGMRIVEAIEEGITARDVLTREAF LDAIRVDMALGGSTNTVLHLLAIAREADVE  
LSLDDFDELSRETPHLCAMRPGGPYTMRDLYEAGGVPAVMKELADDLHLDRIDFAG  
RSMRERVEVEVKDREVIRPKEDPVHEEGGIVVLYGNLAPKGAVIKTAALSEEMYE  
HEGPAVVFDSEEEATEAILGGDIDPGDVVIRYEGPAGGPGMREMLTPTAALCGMG  
30 LDDSVALVTDGRFSGGTRGPCVGHV/SPEAYRGGPIAVVEEGDTIRLDVRERRLEVD  
VEDEELEARLEEWEPPEDEV TGYLRRYRELVRGADEGAVLR
- 35 <SEQ ID No.:1198;PRT;Methanopyrus kandleri>  
LGLEALDPYGVLKGVIELFVVVDPIGNVPALLAVTSELRPRDRVRVHRAVAFAAVLI  
LGFAVAGKATLDYLGISVEALMIAGGILLRAAFGMVEGDPTGFRIEPGSHIDVAYVP  
LGTPLLAGPGAIVTVIVMLHRHGRLETILACLIVMLLTLYTFRAAERLARFLGRSGIRV  
LTRVMGVLLAAIGVQMVL DGVSAFVRG
- 40 <SEQ ID No.:1199;PRT;Methanopyrus kandleri>  
VPANLPPEYHELEEKYRKARSPEEKLRITEEMLAVVPKHKG TENLRALLKRRLAKLR  
EEVEKRRRQQKSGGGPDYNVKKEGAAQVALVGPPNAGKSALLREL TNADPDVASYP  
YTTKEPVPGMMEYKDVQIQLVEIPPIYEGFTRGDGSKFVG VIRNADALCLVVDLTED  
PVEQLETVLRELESAAIKLNQDPPSITIEERTVGGIEIRGEDRLDCDPNDVKDLLRDA  
GIHSAVVVIEEDGITLEDIADALDKRIEYKPA LLVANKGDAPGSKESYERLVERVEDLE  
45 FDLPPVPVSAEKGINLDEFKRRLYDTLGIIRVYTKKPGGKPQKPPIVLPKGATVEDVA  
REIHSDLAKNLKYARVWGKSVKKDGMMVGRDHVLEDGDVVELHG
- 50 <SEQ ID No.:1200;PRT;Methanopyrus kandleri>  
VRTLRVAACVLAAGRSTRFREALEERGE EEPVSKLVYPVAGKPMVAWVVERASRVV  
DELLVGLGYDAGLVWDVVRQHATVPARPV LNDPVDVPMARTAANLLRRSDADVSLI  
LAGDQPTVTAETMRRLAETA AEHGASVLDRGAPNEEVSGDDL LGHPPLALRKDV

VPEFLETIEELAADV RGPNALNLPVLRECGLAFRVVPPRDDAELNVNTPDELPEV  
ERALLRSD

5 <SEQ ID No.:1201;PRT;Methanopyrus kandleri>  
MIDGLGTSELLILAVILLLLFGPKKLPELARAIGEAVGEYRRAQRRVEWELEAEERRK  
EKEKRDED

10 <SEQ ID No.:1202;PRT;Methanopyrus kandleri>  
LDSWSEKLDVDVWELLKPCARNRNIARILEALLTRLALHWIDDLPTTGTTYKDPSR  
RSGCSGTGVIEAPRGTLVHRVSVGSDGKVFNYEITSTNLNHAPIEESMVGERVYVD  
EKLAACKRQLSESERFLLGDACRAARSFNPNCSAPHAIKVVKKGWTNSGAPTEV  
PRGGTEESAEVISGRGAHVERGVPLRRDAAPGRP

15 <SEQ ID No.:1203;PRT;Methanopyrus kandleri>  
VVDNLYDQFVKYHGDAAQALVAVFTGKSVHLATVCVGGYAGDVEKLSGLYSTVRTR  
PESMRSFLESVIPTLWKYLSMHLRDDVGDRAHMISSGTPFYSGLASGYVHSYLAA  
SGGVLIADTKDPGSVERARLVFPYPERVGKITLARGSNLDERCYSYSEVGYEYEWNG  
TKYACEAGPLTRFSGSLQGRG

20 <SEQ ID No.:1204;PRT;Methanopyrus kandleri>  
VCSVSLDGLLETPIIDRTFLKLAFTGVLSVLVSEEPVRALIRSVPRSVVLVFGGSCGG  
CTTTLAEIGIDLKASPTWIPRSGLSGAH

25 <SEQ ID No.:1205;PRT;Methanopyrus kandleri>  
MEGLLTIVRRLRARRVVEVGHGRNLRYLKGLLKAGIDAWGVEIDVQHVRRALEEEV  
PSNVNDAVEKSRWVRRVLRPDLVYAVRPPVELAVGLIERIPTVALRMREEERHELP  
EPSIQIGDWDLHTVLDLHTFEEDRTVKPQISG

30 <SEQ ID No.:1206;PRT;Methanopyrus kandleri>  
VRWSGRAHVFGDDVDTDQIIPGRCLRRVSYDELGRYAMTGADPEFPEKVREGDVI  
VAGKNFGCGSSREQAVMALQQAGVACVVARSFARIFYRNAINRGLPTVEAEEDPTE  
VVEDGNRVTVDLDELVL RAGSEEVPLREPPEFALQAWREGGLLELVKKNPDKPPW  
RD

35 <SEQ ID No.:1207;PRT;Methanopyrus kandleri>  
LSERLNRFAKFLDITVHIVMISILAITLIFGVGVYDIVSTFLTSPYQVRFRMTFGLIVE  
CVFDVLLLLEVYQSVLETLRHRRVPLRYVVDITIIMILRETFLKYRGTIRPMEMLSVT  
AMLTVLIASRVVVLKYSPDYFKTHLERIRGQEREVER

40 <SEQ ID No.:1208;PRT;Methanopyrus kandleri>  
VPSVAERILSEKVGEPEAGETVYVEPDVIMLHDGSGATALRTLRELGVVERVESPEK  
VVLIFDHSVPPSSVEAANRQNELLEFARRHRIEHVHVDEGVCHQVLVEEGYAGPGR  
VVFGGDSHTPTSGAASALAFGFGGTDMAFALLYGELWIRVPRTVRVHVEGELEPA  
TAKDLALT VVGELGAGYADYAVLEYTGLPERMSLGDRMCLCNLATEAGAKSAYVPP  
45 KEGPEELRPGDADEVIELDASEVEPVVSVPHRVDDVRPVGDVQGVETRVFVGS  
TNGRYRDVRVFTEILEELDGPHPDVRIVVPASRRVLERMTEAGLTLKLRMGVMIA  
PPGCGPCLGEHLGVLGDDDDVCVSTANRNFPGRMGSRRAEIYLASPVTA AVAAAEAG  
ELVDPQDVLG

50 <SEQ ID No.:1209;PRT;Methanopyrus kandleri>  
VQSPYVREAVREMDLPDEVIVYDITLDRDGEQTPGVSFTEQKLEIAHLLDELGVQQI  
EAGFPVSEGERDAVRRIAHEGLNADILCLARTLRGDVDAALDCDVGIVITFIATSEL



HLKHKLRMSREEVLRIADTVEYAKDHGLWVAFSAEDGTRTEFEFLERVYRTAEEC  
GADRVHATDTVGVMIPAMRLFVAKIREVVLDPIGVHCHDDFGMAVANS�AAVEAG  
AQAISTTVNGIGERAGNAALEEVIMALKELYGIDPGFNTEVLAELSRKVSEYSGIDVP  
PNKAVVGENAFRHESGIHVAAVLEEPRTYEPIDPKEVGMNRKIVLGKHTGRKAVVA  
5 KLEELGVEPEEEIVEEV LKRIKALGDRRVVTD SKLEEIVRNVL ESRGDRDDPGSR

<SEQ ID No.:1210;PRT;Methanopyrus kandleri>  
MVGEGVRLVRKIEEPVKLKVYLLEGDKVDGVPVAVDWILERVRELGLRGATVHRCFA  
GCGRGRGRSEARILRTSMNLPVVVEVVD SREKVERLLELLKERLGVGVVTLERLEVA  
10 YDLEG

<SEQ ID No.:1211;PRT;Methanopyrus kandleri>  
VVKIGARELAAVAIGGALGAVCRYLLSGLVPQVRGFPMTVLNVNLGSFVLGFLTW  
STMLGLRLSPEVRALATVGFCGGLTTLSTMAYETVELLKASPVLSILYLTANVVLGIA  
15 AVLGGMAAAHVWWSGRA

<SEQ ID No.:1212;PRT;Methanopyrus kandleri>  
VREIELWTAVLAVGVVQGITEWLPISSEGGATMTMMKVLGIPPSTAMDLALWLHAGTL  
LAVLLRFGVPYWLTVRDLLMGGPWRRLLGLFAIVATVCTAVVGLPVYKVLKGIFSAAT  
20 GDAVQMAIGGALIVTGLLLRISPEGLRDRREVNVDVAVIVGLGQGFVIPGISRSGTT  
MALLLWRRFDGGEAVWLSFYLAGPAMLGATALELKEGLSAATKMGT SWMVTAGV  
SFVVS LICMEVLLRVARRLD FSKVCLLLGGIALLVPLAAKML

<SEQ ID No.:1213;PRT;Methanopyrus kandleri>  
25 LTRAVTVIGADRP GIVAGISSVLA EHNANIEDISQTVLRDLFAMVMLVDLSEADVSV  
GKLREELQKAGEELGVDVIVQHEDVYRAMHRV

<SEQ ID No.:1214;PRT;Methanopyrus kandleri>  
30 MSSLDVEEVETIEMIRMNRNL DVRAVTLGINLLDRAHPDPEELARDVREKIVEVAGDL  
VEVVVEEVEDELGVPIVNKRIAVTPCSIVAASAVRKEGREAVLTLAEALDEAAEEVGV D  
YLG GYTALVYDGFTEADEAVLD TIPEAIEGTERLCASVVVADERYGINMDAVYRTAE  
AVKETAERTDGHG CARLVALTNAPENTPFMAGAFHGVGQPEACVNVGISGPGVVR  
AVVEELKD VDFRTLHDEIKRTAFKITRVGELVGRRVAERLGV EFGAVDLSLAPTPEE  
35 GDSVAEILEGIGLESCGCPGSTAALHLLMDAVKKGGAAATSRHGGYSEAFIPVSEDA  
GMARAAEEALTLEKLEAMTAVCSVGIDMVVPGDTPVETIAGIIADEAAIGVV TGKPT  
AVRIIPAPGKEPGDEFEMGGLLGRAPVMDVSDYRPTMFRRDGRIPPKFPR

<SEQ ID No.:1215;PRT;Methanopyrus kandleri>  
40 VNASPTVVVIPGDGIGPEVIDAALKVVRAVLGDELEIVEEQAGYSLWKKRGVTIEDET  
IERCREADAMLF GACTTPEDPEAKSPIVTLRKELGLYANVRPARSWPVPRPVDTEF  
DLVIVRENT EGLYTGCECEIHDGVTVALRKISEEGTRRVAEVACDLAEERSGRVTIV  
HKANVLKLT CGTFKRVA AETVERRGLEWDDEYVDAAAYKLVREPDSFDVILTSNLF  
GDILSDLAAGLMGSLGLAPSANLGDDAALFEPVHGSAPDIAGKGIANPVAAILSAAM  
45 MLDHLGYGEEARIIERAVEEV LREGVVRTPD LGGSATTEEVAEIAIERVATG

<SEQ ID No.:1216;PRT;Methanopyrus kandleri>  
LPITPRNIVRHELIGLECRVVKSLGPPYEGLEGRIVDET KNTLV LKTESGEKVIVKDQV  
LLELKLPSGERVRVDGALLVGRPEERLSKRIKYAEVV RGRFDPEDYLD

50 <SEQ ID No.:1217;PRT;Methanopyrus kandleri>

LTGEYRMAKDIGLGVKPPRRECDDPNCPFHGNLVRGMILEGVVVSDRMDKTVIVE  
REYYRYDRKYERWERRRSRIPAHNPCCIDAQEGDKVRIAECRPLSKTKSFVVIEVLE  
RAQER

5 <SEQ ID No.:1218;PRT;Methanopyrus kandleri>  
VKAIKAKSPHAALPVGARLVCADNTGARELQIIAVKGYKGVRRRLPNAGIGDMVVCS  
VKEGTPDMRKEVVNAVIVRQRKEYRRPDGTRVKFEDNAAVIVTPDGAPRGSEIRGP  
VAKEAAERWPRIGSIASIV

10 <SEQ ID No.:1219;PRT;Methanopyrus kandleri>  
LRWTKSSQPRKQRKAFFNAPLHKRQKLMSATLHPELRKKFNRRSLPVRRGDMVRI  
MRGDFKKGHEGEVVEVDLKRRLRIYVEGATIERANGEKVYYPIHPSNVMIIEPNLDDPM  
RRKIIERSGGTPEVEAVPEKSEEEKEEKEEKEESEE

15 <SEQ ID No.:1220;PRT;Methanopyrus kandleri>  
LGRARSGPKRHVKRLAAPYAWPIPRKEGGKFAPRPYPGPHTMDTSVPLLILVRDML  
GYADYAREARKIITRGEIYVDGVVRKEPKFPVGIMDVVEIPRTGDRYRVVMNEHHRL  
DVVPISEEEARVKVCRICKNTYVRGGNLQITMHDGKNWLVEIEDPTDPKEDVYSVG  
DSLVLLELPEDSGESWKVVDHIPFEEGVWVYAMTGRHSGEVGRVVEIQTFEGPQE  
20 DLITVENPEGDQFQTTKGRLAIGKDEPLVTVRKEE

<SEQ ID No.:1221;PRT;Methanopyrus kandleri>  
LSVVDEETRRKILEDWESNPMRKPRVGKVTVNIGVGESGDRLQKAYELLQELTGQK  
PVYTRAKQTNPSFGIRRGQPIGVKVDLRREQAIEFLDWTLDVAVDRELHESQFDEFG  
25 NVCFGLEEHIALEGVEYDPEIGIFGM DIAVTLERPGFRVMRRRRRCRRPVPRRHRLTK  
EEGIVFMEEFDVEVLP

<SEQ ID No.:1222;PRT;Methanopyrus kandleri>  
MARREFGKGARRCRRCGDTHGVIQKYGIMLCRQCFREVAEKMFGFKYN  
30 <SEQ ID No.:1223>  
LTLMDPLADAMATIKNNEVMGNKECVIEPASKLIGRVLKVMQEYGYIGSFEFIDDGR  
SGKFLVLVGRINDCGVIKPRHPVKKDEWEYWEQRYLPARDFGLLIVTTPEGVM SH  
YEAKEGIGGRLLAYVY

35 <SEQ ID No.:1224;PRT;Methanopyrus kandleri>  
VAEAKFEPAKDAIPGVVMEERVKIKDDVEIEISQREDRRYEVTVKGPKEVTKEFY  
PDVYLWVEDDEVVIAATRSNRRQKAILGMIKAYIENMQKGVTEGHEYKLKLVYSHFP  
PEVKVDQKEGKVYIENFMGENVPRVAEIVDPENTEVIVQGQDIIVRGIDKEAVGQTA  
ANLEQATYIKDRDPRVFQDGIYIVEKDGGKIV

40 <SEQ ID No.:1225;PRT;Methanopyrus kandleri>  
LVRNP NLSKEEERLLKLREELKRKKPKFRRQEW HRYKKLGEKWRRPKGRH SKMR  
RKLKSKPKMPNPGYGSPPKVRGLHPSGYEEVLVYNPKDLEKIDPKRQAARIASRVG  
RRKRQEILEKAEELGIVVLNA

45 <SEQ ID No.:1226;PRT;Methanopyrus kandleri>  
LSEMTYKDAGVDIDKEAFVRAIRDVLEKYKVEPEGCREVEGIGHYAAVLEVHGELL  
TLNVDGVGSKVLVAQLVGRYDTVGIDAIAMNANDAVCLGARPLAFLDY LAMEDPDP  
DVCAEIAEGLGKGAREAGAPIVGGELATLPEVIRGKEEGRGFDLVVACLGRVEGDPI  
50 TGEDVEPGDAIVGLRSSGIHSNGLTLARKVLLSEYDVHDELPHGRTVAEELLEPTRIY  
VRPVMEVLRDYEVRGIAHITGGGVENLKRRLRDDVRYVLDDPFEPHPVFEIIRLGNV

PVEEMYRTFNMGMGMALIVPEEEAEDVDTVSKHVEAKIVGHVEEGRGVVHMDG  
HEVKL

<SEQ ID No.:1227;PRT;Methanopyrus kandleri>

5 LSERRGGEKTL EEVKKKVMERVEEVLPSDVVVTDVDFEGPEVVLYTNSPHSFVKDD  
SDLVTRLAKALRKRVKIRPNPAALSPAKEAKKVKIIP EEAGV SERDLLFLDTGEVVIF  
SKKPGLVIGKRGKNVHRISRDTGWVPRIYRQPPISKT VNTT RRLILSDDSRKFLR  
NVSARIFCGRTRSRGTESRWARVSALGGFQEVGRSSLFLHTEESRVLLDCGVNVA  
10 ANGTDAYPHFNVPEFRMDDLDAIVITHAHL DHCGFLPYFYRHKVIESRPVYCTPPT  
RDLMYLLLTDYIKVLEKRGQEPPEYTEKDVKKVIKRTITIDYREPTDITPDM SITYFNAG  
HILGSASVHVFLQDKGHN FVYTG DINPTPSRLLEGADNRFRKRVDSMVVEATY GDSR  
HGSRRKEENRFRKIVRDTLKKGGKVLIPSAV GRAQEVMLVLED MHRKDELEGPVY  
LDGMIYEATAIHTAYPEYLNRR LQHRILHEDDDPFTSEVFEPVEGSDHRQAIMEDDE  
PAVILSTSGMLEGGPILEYLRELSDDPKNTLIFVGYQAEGTLGRQIQE GAKEVPLPTP  
15 TGKTETLRIELRVETVSGFSGHGDKIELTKYVRSIRPSPPSKVFTNHGEPRACKYFS  
NHLRRTVRKVFSMAPENLECFRLT

<SEQ ID No.:1228;PRT;Methanopyrus kandleri>

20 MKELDQLTKGTTTVGILADKGVVLAADRRRAVMGNLIAGKQVKKIFRIHDYIGVTTAGS  
VADAQKIVDLMRAEARLYELRHNR MISARALANMISHVLHSSLKAFRPYLVQLIVGG  
FNDDDPALYNLDPSGSIIEEDYTATGSGSPTAYGVLEAEYEEGMSLDDAEVAVRAV  
KSALERDTGTGEGVT VVTITREEGYRELPEEEVEKLLS

<SEQ ID No.:1229;PRT;Methanopyrus kandleri>

25 LHAFLGNAQLPSTPRGDRLEFSEWYAEVLRSAEIMDVRYPVKGMVWLPYGF EIRQ  
RVVEKLRRKLRETGHEEVLFP TLIPETQLKKESEHIAGFEDEVYVWTHGGLKELDEK  
LALRPTSETAIYPMFALWIRSHADLPLKIFQIVNTFRYETKHTRPLIRMREITTFKEAHT  
AHATEEEAEQVKEAVEIYSSFFDELGIPYIASVRPEWDKFPGA EYTVAFDTLMPDG  
RTLQIGTVHMLGQNFARTFEV TYETEEGDQEYVYMTCYGISDRVVASMI AHGDER  
30 GLVLPPDVAPYQVMVPILKKGVR RKILERA AEVEEMLREEGVRVKVDDRDMSPGR  
KFHYWELKGVPLRIELGARELEEGTAVVFRRDELERETYAFEELPDVVP ELLEDIAM  
ELRKRAREKFEKGIFRTDSPEEARLVGEGIVETGWCGSERCGVRMEEEFGGDVL  
GTPYPEEDTEFERCPICGETAEYTVRIAKTY

35 <SEQ ID No.:1230;PRT;Methanopyrus kandleri>

LSVPKKRMQLPREVVVGS NVLPEVPKLLRSVGVPDGVVAVFSGRTTMKIAGNEVAD  
HLEEAGYQTSPVIVKGSTGDDVKKALEALDEIDADVAAVGGGKVIDVAKVAS YRR  
GIPFISVPTSASHDGIASPFASIRREGRPYSEPAQAPLAILADIEVIREAPERLIRAGVG  
DVVSNVTAVKDWRLAHLRN EPYSEYASSLSLMAARIVMKNAKPIGKLLPEGIKKL V  
40 QALISGGVAMSIA GSSRPCSGSEHLF SHALDVIAERP ALHGEQC GVG TIIMEY LHGG  
NWREIRETLETAGAPTTAEDLGVSDEEIEALCRAHKIRPD RYTLGDKGLTREA AER  
AAEETGVIQ

<SEQ ID No.:1231;PRT;Methanopyrus kandleri>

45 VAVEKGDFVKIHYTGRVKDTDEVIDTTRKEVAEEHDLNVESGPVVVVVGAGMVWEP  
VEEALVGAEPGDELEVEVPPEKAFGERDPSLVRTYRESEFRG SVKPGD TVVSPDG  
RRGRVLSVDGGRVRVDFN HPLAGKALVYEVEVDVLED TVERAEG LLETMVPSVD  
AELELDGNTLRVRVEGD DAANPAWARAKQRF AKLMIEYDDAVEEVVFEERFTE

50 <SEQ ID No.:1232;PRT;Methanopyrus kandleri>

VPDVRGWPGVRGGVSPEEVFKPTGYHAGPDTPRIVIIENKVVNVQGAEGLELNAEE  
EDDTVVAELVKEGYEFDEPIHMCVGPWPPEGVQRIVTRLIVEPEAKIQLMSHCSFP

RARDVVHEMEAEFEIGEGADVKTVDVHYHGEGGVRLKAKYDVSVKPEASFVTEFR  
LTEGRVGELEWEMGARVEERATMEGVARLRAVGEDRVRAVESVRLTGEDARTLLD  
FKAAAIIDGAFVELVGEISGEADGARGHVECSEIIKGGGKVVSVPKLRVWHPGARLTH  
EAALGTVEKKEVETLMSRGLSEEEAVELLVNAMLRG

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<SEQ ID No.:1233;PRT;Methanopyrus kandleri>  
LALLEVKDLRVESEDGTEIVRGASLTVDEGEIVDLIGPNGSGKSTLAKTIVGCSGYEV  
VEGEVRFKGRDITDLPMYERARMGLTMSWQEPARFEGTLVGEYLSVCTDDEDWA  
RRCLRIVGLDPPEEYWDRECGENLSGGERKRVELAAVMAMRPDLVILDEPDAGLDM  
SSMEDLAKVIETMREEGSAVLLITHNRDLAEQVGDRAVLMMDGKIVDEGDPKDVVL  
KCLMCGGGLVCGAE

10

<SEQ ID No.:1234;PRT;Methanopyrus kandleri>  
MPEIEVYEIEPERKLELLREAPSVTEAPAWDAVYPYHRHEEGLFREVVRAVREVLV  
ETEAAARVCVGLGMDSTLCAAAAARACEEYGVELVCYTVGFYPGMPREL VHARAY  
LVASELDSRYETPVYLYHLDVPPPVESKRELCRLCGRLRFEVAAQAFPGSVILGGAN  
FGEAPHRARLDAITHHGQAIEYRPLLELGFDDKGHVVAALREVNHFHPRLEWWKNES  
GCGVRDYL RDPDPEGVLEAAEANDTFHRILLEGAWCGHYDTAVVLYDGERVYP  
VLIPLPWGWGRDAQRAAEAAFDLADRWEVGNPEEVQEVDPPLESILKRARQLG  
TVQPSTSPR

20

<SEQ ID No.:1235;PRT;Methanopyrus kandleri>  
LLRRGKSAEEIAASILRKEGFVARNYRVELEDELVAEIDIVAEKDGERYAVEVKAG  
TVGVDVAVRQAYVAAKLTGYRPLVMGRRVHPSAEALADHLGVEVREFSEFVEVEPV  
DELAADVSDLLQDKMLVLLSAASNVSWE DLYAALQGDLRRVTELVRVRDRSQAEEL  
IEALAFKLMASETVGAVKGVGDEFLLELDPRVEVPDGTTLVVLNRWGSPAFVLA  
PVSVGTHRARMRSWEGKVETGERVVYLGEVEG

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<SEQ ID No.:1236;PRT;Methanopyrus kandleri>  
VTSFRLRPVFGVPGDDVTRPYLRRLAEDELVRTTREDAAVYAAIGAAEVSGEPAAAL  
ATCGPGVAVALAGLACALADRVVLCATGEITERGFQSLVPSMASDGVELTVTDDP  
EEAARTLARSEPVLVDPGFDPDGVS AELEGIEPVEPD PEDVERVRGLLEGKRVAIL  
VGRGCYRARC GELVERLCEVLEAPIVETMRGRGVVPEYHPRNAGVVGLRGWAND  
MVEDADV LALGARLSGRTRADIDWPTTVAVGFGVEDADEVVECDVRAFVEALLED  
PPRTEPWNPEPGEPEFDLELYRVVKAALKAWIGPATVD SGQITPTALLAARLSSPS  
ELIHSGSFCPMGFAIPAALGASARVPEMALALTGDGGFMVSCQELETAVREDLPIAV  
LVTRNGELGFTRQVMEEKEGRAAKMGLDADVLSIVESLGAEVEVIEKPDGPGEVKKV  
LRDVEMNGETTVVVVELPREDVPMPGSG

35

<SEQ ID No.:1237;PRT;Methanopyrus kandleri>  
LTVYKQRFVLDTTAFTDRGVVDELGDGDLCEAVTRLLDLIGRARMELAISCYIPYPTV  
YRELKGFLERNGCPELLSRIDTWIVKKTPNRYEVKVPARLFMAYVKDMRERLDRGR  
KRAEKAIWEAALEAYEIMLREEADV PKERIIREVIGETVRRFRRKYRQTVRHGTLDSA  
PDLDVLLLAKELDAAVVASDEGIERWARELGRLFM PACSFPMIEEYLRMSREVEG

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<SEQ ID No.:1238;PRT;Methanopyrus kandleri>  
VREPSRGELEEYREVLEELTGSDLG IADREVTVERIRGPVRADRVFVDGRPVLT VTF  
DPWTASC VYTLTPHGAREAEIITGERPERRRLVRRDPYGLLD FEPTGTKRDLEKAV  
TRALEECDVG VLELETATERVNGVELTGLAVYTAREFLYVDVVPDPAGRPNPVNA  
VARILHAFGG EETRPWIHPEYRFLGVRRIRDGKVARCRLGRELVEFEARITRAGLVL  
RPARGD

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- 5 <SEQ ID No.:1239;PRT;Methanopyrus kandleri>  
LDPELKVAVLGKGKGGVGTMLSLAAELGVPLVDADVTEPDVPAYLELEVEEVLEEI  
RARYAVKTDDCVECGRCEVCPWDAVEDPTACDGGCICAACPEDAIEFEPEVLGE  
IVRSRNPDLNLEVIHPRSEPWWPELAHVHMRVPERPCVIDCPAGLGCPVIAALSRA  
DAAVLVTAPSPAARHDFERARTLVERFGLPTVTVLNRADGSSDDLDDVVIPESEDVLD  
AALRRDARALYRALRSHAREIVEELRSEASF
- 10 <SEQ ID No.:1240;PRT;Methanopyrus kandleri>  
MWLAVTGGKGGVGTTVAVHVHRILGWDALDLDVTTPNLHLYLDCEEVERSDVYIP  
CPKLEDEDACDLCGTCAVVCAPGALVVGSRWDLDPDLCHGCGLCIESCPNGALAY  
DRVRIGEVRRYRVSETGATLTSGSLDVGDRRSRHLVHALLEGADDERDLIDTPAG  
AGKDVYDVLKAADAAIAVTQPTPAAYHDLRRLMRVADRAGIEVVILINRSDLSDSWR  
RRIEEVVRDPVVEAPTVDPPRSEVFREAVERCLEEVV
- 15 <SEQ ID No.:1241;PRT;Methanopyrus kandleri>  
LRVAVMVEGDGVSSRFARAPEIRVYEVQDDDELVESTSNPVANLPRGAGRQILTV  
LTELNVEATVAARYGPNALQGLKAQGIKAYVAEPGTDPEEAALKAARGELPEE
- 20 <SEQ ID No.:1242;PRT;Methanopyrus kandleri>  
LIRRDVVKVFRCSRCGEIIEVPYGA PKPSSCPNCGAPAVFIHRLNPGPGTWGSYAGL  
GRGMGRGGPGRGGGRGGPGRGGPR
- 25 <SEQ ID No.:1243;PRT;Methanopyrus kandleri>  
VVFHDASECEGCGECMRACPTGALLVSVGYVEVDASKCRACGSCARVCPTGALR  
MEPKRG
- 30 <SEQ ID No.:1244;PRT;Methanopyrus kandleri>  
MASRRYRYIGPCRCGLGPHAFYEDTETGEIKHAWQVLGEEGAPAPAWPGGWWR  
GGWRGGPGWGGGWWWLATADEETRKEVLKAIREFGEDLAEAVEKLAESVSEGP  
EGGKTEELEELRKKLEELEKRLREMEKE
- 35 <SEQ ID No.:1245;PRT;Methanopyrus kandleri>  
VPTVRDAMTEDVVVGPDEPLERVLRTFASESIHGVPVVEGGRLIGIVTSVDVVRAL  
ASGEWRELTAGDVTRKAVTVDPDEDLETALDLMAAVGEDRAVVEDGEIVGVTVL  
DAIRVLLGE
- 40 <SEQ ID No.:1246;PRT;Methanopyrus kandleri>  
LKRLFYPEAVAVVGASRDPSKVGHGIFRNLLRDFDGPVYPVNPHADELLGRRCYPS  
LLELPERVDLAVIAPARVVPEVVREAGEAGVPYCVVISAGFSEAGNEDLERELVRT  
ARKVGVRLVGPNCGLIINARIGLNASFAAESPPPGNIAFVTQSGALATSVIDWFSSGD  
VGTVGVGFSKFVSLGNAADLDFPDFLEYLAEDDDTDVVVLYLEGVKDGPRLDAL  
ECAGRKPVIVLKGGRTTEAGAEAVGHTGSLAGSGEVYEGLVEGEGGIFVGGFEEAF  
DAAKLLAKAGPPTSDRVLIVTNAGGGGILATDALHELGFELPEPAGDPSVLPPEAAT  
GNPVDVLGDADAERYRVALEEFADPDYGA VMVILTPQSVTEPVKTARAVVEFVEE  
45 FPGPVIGVWMGRHSVALGIRVLEEGGVPTFPSPERAARALYHAARWAEVL
- 50 <SEQ ID No.:1247;PRT;Methanopyrus kandleri>  
VGGAVKTLLEVPEGRTVRVVDVAAGKGAAAMLYELGIRPGARVEVVKSGPGPVIVR  
VGGAKYSLGRGLAAKVIVVEEQG
- <SEQ ID No.:1248;PRT;Methanopyrus kandleri>

- 5 MRTVALAGPPNVGKTTIMSRVCRANLEVGNWPGVTVERTCTYEFRGDRYRLIDL  
GTYSLTAFSEDQQRVARDYLLGRTDGKPDVAVVVGDALNVAGAVRVFLEIAELGYHH  
VILAVNMLDEAERAGIGIDLKRLERELGVPVVGISAKRGYGIEHLKRAIADVQGRVE  
PNPRSPRYPREVERAVKELAPEVGERLPEYPPRWAVLKLLEGDPPELLRELEKRDPE  
10 LLKRVKEVKKRIAERTSHDPAVLISQARDELATRIARNCVTGRPSLSRQDRIDRVLTH  
PVWGTIALGVLGTVFASAFLLGDPLSELVEGAFEHLAGFARSLPAPWSDLLAEGVI  
PGVGTVLAMPYPYFVFMLLLLTVLEDAGYTARLAALASGLLARFGLHGKTVFPAVLSL  
SCNVPITASRIIEDERARLLTAIVVPLIPCGARLEVITFLTAKLPDPWRVPAAVSIYVV  
ALSIFVATSYILHRLLFGKPEPHRGHVIELPRLRKPHLRTVLTWLRNEFLQKAGT  
15 IILAASVLLWVATRYPEPLGTGGSAILVKGALPVTVALLGLDWKGAVALLNGIVAK  
EIVISTLAMLHAHLTPENAYVLTLSALYIPCAATIGAVYSETGSMRYAALSVAANLSL  
ATLVGAHVHVALVALGG
- 20 <SEQ ID No.:1249;PRT;Methanopyrus kandleri>  
MPGLEEHLEWRWFKNESEAVTVYRTLGLAEAEAGMSEVAETFRKIADEELRHAIVA  
RIAGKLSIEDIRAEVERLAEREAQAELRRNVIEEYGDSESDVRAYLISTAHDEERH  
TKMLRNLLKRLE
- 25 <SEQ ID No.:1250;PRT;Methanopyrus kandleri>  
LRVVLAAVLGLLAVLSPAAAAGTLDVKDVQYPAEVNACQEMEVKFKVVDASTGEPV  
SDASVIVRIAGEEHKDTPPENWERGHYAKVTSSEGNVTAKLTAPGKEGTYVWV  
KVEKDGYESLTKNLGELKVTGSSTCPNEGEQHRWGEQTGGMADVPVSPVLVILGAL  
CVLALAGATTR
- 30 <SEQ ID No.:1251;PRT;Methanopyrus kandleri>  
LKELMSSPRGDPEFPLRAEPLAPVYVVRTQFLKDVDGDGRVDHLHPSEAAALEYLI  
ALGHDLDPFDVERDSRPMELGSLSPAVEDLRDVGLPVVPSTVRPPDASWAAAILT  
YLLEEVPIAYGPKRTVLSFSAVYRTPVEHRPMRTAPDVEVDHECVVQTDSTRYVYV  
HCTRYGVAARRDDVFDSDACGVLATTVDHSPPPEDAGPSEVADHVLTERPVLAA  
35 VDSEHLNPEHATGTVPFVVAVEEGWMEDWKEGVEHDLPADGIGLASYLATLTLD  
RLPVYHRDKDGSFKEWLREHEREIIGRARPEEIDPVVEIAQKLEGCELDLKTPEDDL  
HRLFDLRRRR
- 40 <SEQ ID No.:1252;PRT;Methanopyrus kandleri>  
LVGSHAHIPHPDVERIRTLRVLREVYRRGRKPSLEVYRTVNGSTCGPYVARW  
RRDSRFKHGRTLYLGKSENEVSFVEWLVS�DRGEVLELARHLMNRNLSVLKTLT  
EVSDLPYKKVRRVLARGLALAFDARPAGSPGIRDVLEELPDRLESFVIRTLGGWPAH  
YSSYLESSVRAGDSSTGGTRYPTWSWNSSAGSCGTAGDASKSVHVLSSSTNAHVDI  
V
- 45 <SEQ ID No.:1253;PRT;Methanopyrus kandleri>  
VRIPILLVSLTVAAIGAQAALDLYPYEVIRIGTDAIGPPVLHATRDGLSVYYPTKGGTW  
VGVSLDRDLRVRGVALDAVPVRERDLPTGRGSYYRALEVNGEVLVDDLDGVYR  
DAGRSPNVTRPRWKPLTCVAYVGRDGRIRAVTIGSGGEVTAFDLNVRGEDPVALID  
40 DETALACYRSGGDVYLAVLGTEWSVLERGPECVLLHREGDRWVEVLRWYLPERR  
HYDHLIEAPHERLVVGRVWELLGREVWTFPLPLSPLIDRSTGRILGWRVGSVPVLES  
DGEIEVTVGDGRTTVGECELLSAVDLWGHLLVLRTPDGRIEFELVEFRLYGPPEV  
RDLKPEVIRLGDRTLYLATAGVEPVTTILVFDPGTRRLYTYGKDYRVEGDELEVTD  
PWGRTLRYVYDPELGPVPPVLVRDGTVLWNGGGFEEVLTTSGPEDVLPLDDTGIL  
50 LISRTGSYLVDLGRDRPEVLPVDAVWNDYGSCSHCGVIVAVREGDAVRVITPLGTF  
ELPDAREALWLNDRLVVYEGKDGALHVVTHDGRRALGEAEDA EVVARVGPFFVLR  
ERGTYELLARLTDGLCVGLPLPEVRGHEIVYRVGDRECPIDLEDLLPERQVPDRWY

VVEDLALGDLPAWCRPAGDGTCTRVLRDGDIEIVVELSTGFGPVRVRTGLTGDPVIA  
GLNRSLLTVVYRAPDGTAAHALLSPTPIVGRYTDKGLEVVRLGPDGPERVDLLPPAE  
RETLSLLVSTVPEYACATRVKVGDRTYLLSGSLYDAEGRALDHRPGSTPGCAG  
ETVVVPAPIFSSLRYYVPVATVPALLVGSREPPSGDRIELDGVTVLVHREGDVTULT  
5 FVRDGRSVDLVLPLPRGDWRVERVSGRALRLSTPDGFELELVTDWPWPTPTVRVR  
TGPTREVERWDGDGYRPALTLRVSPPEVNVALLSNCDVAADVGRVLVFLSGKWVR  
DVGTLRSVAVWSSDDSTVLLERVAADFRTREVRVLTLPGRFVRVVPTELGC DGEP  
VTLIVTEGTVVALTGSSRVLEPEYLRRLDGGWFLAVFDIDGEYLVVLSDGKKVVDNR  
10 LYDSVEPRPDGTLVARTPAGEEVVLRVERTGDGWTLTEGRPDERKGGGRTRRIPV  
PVPPVPVRRRRSA

<SEQ ID No.:1254;PRT;Methanopyrus kandleri>  
VSGDYELLHKRRERVQRLRVERHEPAHTDPRRLGGAGLAVRPSILPVTTV

15 <SEQ ID No.:1255;PRT;Methanopyrus kandleri>  
LRVMLDTNVVLRAVEELLSPSIPEVTRPVLISEGGRGVRRRLIGLKPSSREQRVESLY  
TFTFSLGCLDVTLVGPRLMKEYEKNLAGESFFNRCWNLRGVQLLEECKKWVDP  
DEELVELCRKAHPKDDPADAEHAAVCLQTKAVLVTLDVSHFSQMAEELRREGLALK  
WRTPFDFLQELGVFKCRG

20 <SEQ ID No.:1256;PRT;Methanopyrus kandleri>  
LDKSSLYGLALDVTTLAVLRLVKRYPASGKGFPEGKNSVELVLGEAKDLFRRFELEV  
LAGERELLEACFEVLRLPGVPVKVGGACGKAGLETLRKVFTDPDASVLFITSYGLDE  
FEEVMEELGVDPEEIRAECRLLVQEVVEYGRVHPSEEVIESWVEAGFEVRVVGRE  
25 KFEKKGVHFEVCYTDNVMAITSANMTTAGLERLRECSLVVPLVMDVKAPVALLEY  
EPLGFAAVVGANVHAGVLHEFLTRSDRVYDRSSYRNFEYEEYGGYLPECEGLRHL  
YREL RAGLEWYLREGCPEMLWWVEPEPQTMPDVTPNLNLYI

30 <SEQ ID No.:1257;PRT;Methanopyrus kandleri>  
VGKYVVFREPAEPIYWRKWLAAVKCYRENKECRDYIHKEIGIHKDKVVSQNDIET  
KILVEAFIKTDENIKQGDINTILVALLNQSLELMAKYIAERLMWLGIIWKKGEGYYVIL  
NPNDACKVRRCVYKSHNVIDILDHLKKTLDIDGIAEKLCDDEYSNNCRLSELADEIS  
KFIKKYCNILEKMEDAYYDKYSDNIEKGELWYSKNDVDKAIEVVEKFDRSIVSLAIDV  
SAHIPGILTDMKWILSEIRKAGCVPENEIKKKALDKRKVNEKELQEINF AVENSWIER  
35 KD GELKWMKNQI

40 <SEQ ID No.:1258;PRT;Methanopyrus kandleri>  
LGIQRLAHNSPYSHHRGVKCSGDGGVLLRPADSWAGVLVD TGSTIVAVDAGPNPW  
HAEDTDYLLLTHAHL DHVASLD RYSRNGAKVLC PGDVRDDLGLVDSAVGVKKVKS  
MLYDVIVHPIPV EHTCSAYAYVLDLEECNVLTGDWHVGPRTIDGEIKPLWKAVREV  
VGGE GVDVIVSEATRALVDAPELGGNERVFEYALSLHDP RDVLAFLOPTDLEIIDTAF  
RVASDLGLDVVDSETDRKLKFLERRGDVWEYDVADEPLVRSLYLTVSWEKARE  
LAEAGLVEAVVGNWATVHHLRRRVGVKYAYVIPRSGHASRPEITRLITELEPSCLVF  
RHRSGDATRLERYYSRFVDEV RVWVGRGCRDESLELPP

45 <SEQ ID No.:1259;PRT;Methanopyrus kandleri>  
VPTRDRKIDERFPARDVTDEVAREMPITGRPPLQYIHVWWARRPLSASRAAVLTTL  
VPVDADEDELLEILHVGEDQASWKYTPVTGSHADTSSKGADLRQFIPGDARDEGH  
GVTLRRMYREATGSERPLVDP MAGGGSIPFEALRLGCRV VAGELNPVAVLVLKA  
50 TLEYPVEYGGELLEKMRGFFAEIRKELEQRVGEFYGDNDRAYVWIKWIECPRCGLK  
VPTRPNWWLLRKR GKPEESLVLPDVPEEGEGNEVGFDVVRYSEAREDGFDPGRG  
TVSRGAVTCPRCGTTIQREQVHRLSRRHFEDEHGFVRAYLAAIVEGSGRGKEYRAA



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TDRDLEFFERAREELFERWDELVAEDLIPTEEIPEGEKTRERPLRGIDSFYKLFNER  
 QLLVHAELLRVIRELSGGLDDEYREPLTVYAMIAFDKMINYNTICSRWEYTRGVVKGI  
 FDQHAYSWAWDYGEMNVLAEDGGWYWAAPNVLKAFRQISQALSGVDGDVEVILG  
 DARALPQHRLNLGVESVDAIVVDPYPYDNVQYAEADFFVWLKRLFGHPTFLVTIS  
 5 RSSPESAMEFQRAFSNELTPKDEEIVANRTRHDDPEREYERGLREFLEACREVLPE  
 HGRLLTMFTHKATEAWTSLVRALRDAGFEITEVWPVVRTESEHSLHQRWKAAGVT  
 QIIACRPRSGSEVTTWRRVRDEVRRNVREAFRRAADLVFSDAERLVVARGAALRPY  
 TRYDKVLRSGDEEVEVSPEEVMEEAYRAVPEAIADQFEETIGETPGFEDLDEAGR  
 FYFLYRFFWGYPKPESEAPDYEDVLMALAHATDFPLNKYEYRRRPDAKGKLVRSST  
 10 RDRGTVAILDDEFESRKPGRVNNQVDALHAVLTALTREGDELDMRTALEVAFEHEEL  
 FEPIARALARLREYRLLEEVEDEGELDERYPELKYAALVLKKMREVKQRRRLGG

<SEQ ID No.:1260;PRT;Methanopyrus kandleri>  
 LSGGDLPSVFDVFEPTHEAINRNKNVLSVELSHVEREGTPESDPEKFLALTVPTEGL  
 15 VNTVVSALKRVAGLEGGEVQYMTERYGGGKTHVLVTLYHLATSERARELLERAR  
 GYVDERRLEEELEEVLSALEGKDVRVWVLDGDSVSEPRWWVELAERVDPELAEWR  
 SRDMTPSKGDVEELLDRALDGVLDGVLVLLDEVGTGMLIRSGEEMDRGLEFLKILARV  
 GKADAPVAMVVSAPKGSSEVQRQLERLKEEGEVESEAVLREEVHDVGEEAVEQLD  
 RVGEERIPVSDVEEAIAKVWLLRPREDVDVEEAREAVVEAYEELTSELAGTEGIP  
 20 RDEANAVRRLRETYPFHPRLLEVLRSVTREEPYQLTRSYLEILMQVVGAFDRWK  
 EGWEAPVFDLGDVFLDETEVEEAVVKPEGWEEPAGDLREKLDLVEKEGELARR  
 LAYALFVRSLVPDSRKRGATPKDLLDVARPGEGVELSDVERALEPMEDTLFYLR  
 EGERYYFDRTMNVSSVIQSYMPREERVGWNRRAREELERELRSIGGLGRDALVLWE  
 DEEELLNKLREP KPRVVLPWEGEERAEELWEKAEMENAPVFLVFQDKGRERRL  
 25 LNAALRLSAVERALRSDDKLAREHGKELRRKEEYRNRVRKLLREGYTLIRYPSEG  
 GLAREMFSVEEGRSLGSLGKLEEGIFLEPGEEP GDVRVGGVGGGEARGDDA

<SEQ ID No.:1261;PRT;Methanopyrus kandleri>  
 MLEERELEELAKALRGELDKTGAVLGLLYLAYVETGGHGGMTADDVVRVLQESG  
 30 YDITKERFYSLASQLMKKGYIESHKINGRRVIYTINS DSEYEVEQKLRRERLEKSAPTA  
 ERVSAEEMRRILDRHST

<SEQ ID No.:1262;PRT;Methanopyrus kandleri>  
 LAKVSKVFVVGFTARKGGTGKTTCSFNVGFEFARRRKWKGVKSHPVFFVDVDPQA  
 35 IGKESERAATLTDLFRIGPFDLTPLKLEGDRMVEARRVTKETVERTGGFELFHVKY  
 SPDPEEFDNADPMCSVHDKVFLAHLSTHISESPGMMDFGKFLNAITGAGFDGIVVL  
 DTPPLNVRTTFVLNALEHCDLVVPVLNPESYDQIPDFIRRHVPVRFIVLNQMLKGRTKE  
 AEKIRREIEGYLKRTTLDDEDDVIWIPSNQDLRSCTNTGVPARCRNPKPQAVTPKFHHI  
 40 AWRIEVERERRSKISEIRL

<SEQ ID No.:1263;PRT;Methanopyrus kandleri>  
 VFELAVKAFGLPDSTVTHAKRGLQIMDDRASGRKPVTRGDYGVKTRGVARLVHR  
 AHTTLVVPGLDVVTKWAKRYGKRPWKIVRVNLEDGGGLLDETPLRFEDLPPGAAP  
 45 AAVVRTGNARKVVEEAFLETYPLFAAMMCVLEDAARTMLERFSEEEVETYGEFCR  
 KHPGRHGSSFLIGVALWGWLEERTGETIDVDETLSIEKLARDPVEEAVNGILDVG

<SEQ ID No.:1264;PRT;Methanopyrus kandleri>  
 VDAEHWEVPIVPKPEFREALQRYMISRL EEVGVGPKTVEQIVNLNIEKVEPWNDIKS  
 KITYEIQYNLKHCCCMVEDLKKDLKRIYGELRLEDLCSFGDAALWLLGVRRVVEFIH  
 50 DLLLERPDLTAKVDLWLVGRMLDAGELKAATELLELNGYEVPPSPTRVPELKTTERV  
 HRLGHVMTETILTAHALSNRVDSSSFDEAVGKVRNWFKEAQSSLRNEVQKEDSSEL  
 VVKFIEGLRDTLEDLIRKTL EHGKPELEEVNSTFELLGIDDLGSFFSRACGEFKRAVD

YLVEVVEFDPMGRMAKNLLRASPEIELGDRTLEPEVYDPRWSIFERDLSELDRITKEMI  
 EELVTETDRSSSEREAPPTHCPRSWTPSSRRRLTNAEGTLEPSPTPYRSMTPRISP  
 SDPVGKRSPLEPRPNSPTAAHALVGTLDTVLPTTLRPGSRPSATSHGAVGVEGTP  
 GRRAGGVAVGTTGKLGRGRRLDRARVRLQARGERVARERPRDGHGPARPR  
 5 PVPGHAAVGRRYHRGGGPAGGRAGRGGPARLRR

<SEQ ID No.:1265;PRT;Methanopyrus kandleri>  
 VHPTRPFHGKFLRVLPPEGEPELSIAFSWNLSRTAADAGSLESVLERREERGETFE  
 EFVGRRLREDGWLVGRLRREGGKSRVLEDVRKFRFPCSGPREVRVRGVLSG  
 10 TVSVTELVLDDGSREVTLVLDRLRESFEDVESVTEVVEGEFRRVQDGELESDV  
 VRYGIVRAVRDVVEELVERGEAEYEVAVRAETVNGDEAGVLADEWRFPNAKAAL  
 RSLVREILRTRLREVLEELVES

<SEQ ID No.:1266;PRT;Methanopyrus kandleri>  
 VSPGGVPVPERVPLSPTEEFYDRVKSVERRMSDLGLEPPEDNESLLYDEKYGHF  
 15 WTFNGFGRELWSDLSAVWILVLPNSGLLENIFELEEQPSTGKVLREVERVGRGL  
 LERESKRHFSDYFLGELEVFEASQHVKRFLDEPNFEVAVNLWIAGAALASQDGT  
 PRIAIAISSIDTEVSEFPVGVPSYPLGYILQGCGITASVLCCTAHAMVNRGVEEDQLL  
 EYLSDTPTYGEKVRIICASWVEGTYKEVIKECLEGLKDGLNRLLRKGRGLNMRDLGID  
 20 DPEEFAHEVLRKLADVIANISAVFETVHREPERIVHTLLSVDEEIRLGDKIIPPEEYDP  
 NGTNMYRLEKTFESIDAELKFVEDAMKTVGKLVGSGKEDVAETATKLATEAVKQGL  
 NIIESGGDRKGRSTLGELIESVVKEVMGDDRKRK

<SEQ ID No.:1267;PRT;Methanopyrus kandleri>  
 25 VPECVPLSPTDRFYDKVKSIVRHRMSDLGLRIGDAALYDTKYGPLSPLPIFMDGWW  
 RGSWIRERRLDWGKLDKPWLLTVSVLAELFDSNPPEIAGIPSIEIEPGASKLGYMLR  
 KMIKTGEESLKEKREYGHLSYILWALEVIEVITRRIRDVLVDKPSLETALNFWVIGAV  
 LSSRNVSQVTVISDSVDLEIPKSSVEIPLPYGINIQGSSSITSTLYVIAHAMVHRGIDED  
 QLEHFNIQTVCALWIEENMHKKMIKKGLEELKHGFEKLLKSKWELELEDLGIDDP  
 30 EAFHEVSKKLAIEVTNVSTAFETIQDKPEEIARNLLSVDEEIRLGDEVIPPEEYDPKW  
 RQSQRVKQHVKGTLSEIDTEKLAEDALKTVGRLVGGSKGEEMAETAACKLATEVVKR  
 GLDMVSESSGNRKERSVLGELIEAVVKEVMGDKARKK

<SEQ ID No.:1268;PRT;Methanopyrus kandleri>  
 35 MLPALLALAVLLALPGARALDLYPVEVVEVGTDVAGPPVISWDYPFERGPTVTYPSD  
 GGWVRVRLDGLSLRAREVFDAAAPPDLRGIAYLALERDGRVIAVDYLNRRVLEDRGA  
 HPTVPTVSRSDSGAVVAYVRDGRRLAVLLGEEASVPLEHLRGEDPFVLVREGTVL  
 VAYRSGGDVHLAVMGTEWSVRVRGSECVLLHREGDRWAEVLRWYTPERLTDADL  
 LDLLKGRAPEERVVCGVPVELGSRTVWVFPLPLAPVVDAGTGAVVGWWSHAGLEP  
 40 RELIGTVEEDGDVLVFTGWWEGLHASVAPAARLSGSRAIPGSLGLVGCERVMMAVAF  
 RDPDGHVRVAVPGGVRVAPTVPVETVDLGPGEPLAFLEGLVFYRTPGGDVRCR  
 AVRPEGGPFVRPVVEVPVRRWEVGGKELLVAGSVVLDPGTGRAYVLPSESRGEP  
 VYRRDLSDGWFVAVFRFDDGFVVVLSDGSRVRESREYRSVTRRRRG

<SEQ ID No.:1269;PRT;Methanopyrus kandleri>  
 45 VAHWRNSRHERGRTLYLGKSENEVSFIEYLVSLNRAEVLELARHLMRNLRSVLKS  
 LLPQVSSLPYKKARRVLARGLALAFDARPAESPRIRDLEELPDRLESFFMRTLGGW  
 PAYYFSLHRKVIRSRRGSLDEKHEIPDVKLERWKFR

<SEQ ID No.:1270;PRT;Methanopyrus kandleri>  
 50 VDTGAVDDGMIVVRSYRTLDSEPTWSMSYRVVRYDLVTSRVLVPSGGPSES  
 RSDPRMYPGAFYDPDRDRLLVITYHPRLVLPGGDETGPVLVSEISGASRDPRFVGC

RTLTTTPNDADDVKPVLPEVIDGKPYLVYVEPGEPFEEGGTREYRLVRLDLETGAR  
EVLAIEFGERTRVAGEPRTLHRLGGSVLPRLRARLGRGRAGVRRSSRPSQAARGL  
DGQVLRVPATVRRRPDGRVRPRRLDRSEPDRTRSTETRRLLDRDRVAVPTTLGRP  
ALPVDRSQVHGDGVDRGLLLGRATVRAGPGVQGDPRRR

5 <SEQ ID No.:1271;PRT;Methanopyrus kandleri>  
VIVLNNGTVIIVHLDENLKADAYRLSEFGRLLGHRATGNGVILLYRTRGGSTNVAVVR  
PSGVTYASKLGESGDLVYRTADGVVTVVGNRIAPPRGEVVRVGAEGGVISVLRD  
10 GVLLGFDRDGRVIWASKIPDFEKYLDYSWSPADPRKVLLSYRDTSGLVVISVDSVS  
GDVKSPKYTVTTLDENTAFVDDGTAVTVLKNEGWWIRTYDLGGVPIHADKGVIVYR  
DRFGTLHVAILAEREYLRPALEATGLAVFKREGEFMAVRYDESGRILGLDCEVHRER  
TDGGAVLLTGGEVVRDLTSGRVEWVRTLPDFKGYLDYRGTLITYRDTSGRVRAVL  
ATEGGVVEGLKSRETDETFEFTFPDGTSVVIGKDGRIRETHPGGTTRGGVSGRGE  
QGEQQGNLEGKGNREQGQRQGGPNQGGNQGSSGQSGQNQSNQGGQQGQQG  
15 NQGGQQGGEQNQRQGGQPEEHEQGEQQGHGQRGPEQRGNQNRNQGNRNR  
QSGGEGGKRGSPVLIPPRRRRVHTQHAL

20 <SEQ ID No.:1272;PRT;Methanopyrus kandleri>  
VDVLPLSFECRISQTEWRQNGDEAIVRGTVTVDHLTPPGSPNTVHWVAVTRDWSG  
AEVVLGEGSTEFPGGLLVPCSVDFRTARGPAAILRTGFDVRVSVGYFEHLGGTVGYE  
TAPVILPLTPRVLTVDDVEVTKTVESGGTKELAVTVRFTPPDGSFTLDRVDVVRDKS  
GNIVGERTLDSPIPENDSITVDVLLDDDVSASVEVTLAGRDGQGIQVTRYEKV  
GDLSVGLGADLRVENGSLEGAVEVGIYVPTGTLKVTCDGQPLPISIDGGALSAQP  
QRLKEGAHRVSLVIPARTHEVSFEFTSPTGRVVKRYEWRIPVGFAEDPVVYQVGF  
25 HGTGEATLYVSSRVDDGVLRIPYDGGVYEEKFEYSRELWNQGVAKLRSDAELVR  
VSPEDPYGSLDKLVLELDGVTVERELTVPYTRYSYTVGGYVIDVYPKVDDGFEV  
DVWRSETTGAVRVPAGEGSPDVERIGVRPPTPGTITGDNTRTIPLYGDRVVLVL  
APCQDGTSLAFDREHGDVVALEVDPRDAVRELVRVYRTELSD

30 <SEQ ID No.:1273;PRT;Methanopyrus kandleri>  
VVPAAARRIPTLVSLASLVVLTVPVSGEEYALRDHGSGLTWVWFYDPNTMGSQLP  
SNWKDYLVVWGKPTSVALGFELTANNCTSYFDSFPAHDIVGRLTAQGFDVTSVDYAE  
ANGPVSSPDDLNNATNRRGTPLTPAGLSLRVTDGTSTYYLIPCYGGPDRVPYYLDE  
DSWPAKGERTVIWVPTTSGPVFPFLRGADPNALLVVERPGSERLDLDGDGNPDV  
35 DLGLASLSMVMMLALTIRTVTDYLLVQGPDLYYEVSPDEHLLNVASFRASDVEF  
SDDGTMKLLKHIGVEKGTSVSLEGVDLAFLDRDGTALNVTPSEGDLENELLSLKSA  
LSWDSSEITLSHPSGDIREHLPAITLRVMGSTELTDNLGNTSQFTVMASGRWTSYH

40 <SEQ ID No.:1274;PRT;Methanopyrus kandleri>  
LLLRLDPWCGVVVDYGDTRVFDVTDKGPYVKRADAVIVTHPHRDHYGGVPR  
EFGELRADEVTAALLGMEDEAEPLRSSFEAGLLDVRTYPVNHMC PKAHAVLLSGDA  
RVLITGDWCALGEHPPLWELVDDEVDIVTECTRAASVHPDDPEAAEYRIQRLLH  
REDRTVLLLTHVNPLIDVASEVEILHVLEGDPVDEAVKAGAHEGADLEVSRPEYPL  
45 VTSSVGTVEGLSKRPHVLITERWFLYRDREGRLRLLDAVPYPYIVSGTGHASAAEL  
VRLVEELEPEYLVLRHGSPDGVRLRKRLAGAGLDVRVEAWIGRRGGKLELP

50 <SEQ ID No.:1275;PRT;Methanopyrus kandleri>  
MPFALRVGEAFVGEPEDEPIAHIDLVMGSVEGPVGRAFAEALASPSKGHTPLAVLT  
PGVAVRPPTLITPTVTIENMAQGEKIFGPVQRGIAEAVVESVEEGIIIPRDIIVDDVIIAN  
TFVHPEAEDDRRLYENNKEAMKKAIECAMKGTEPTIDELIEKKDEVEHPLAKF

<SEQ ID No.:1276;PRT;Methanopyrus kandleri>

- VVATVRPVRALPGSSTWVRLSSECIVVRGPDGTVRVRPEDVVSVEHRSSRPRMD  
PDEEVRVLITRDLEHVLPFRSRKLYRGVKAILAARDGDVDRLRLHRRVLRKERK  
PPLFERREDGWLRWPWLEVRVGPPEARRVRELLEYWLRLKESGRDPEDVS  
PRKVGLSVVLGSLILFGGGKGGKGAAGAKVKAGAKGDAGGKTGGTALAKASKLL  
5 LKMIKALMKLGKVTFTWTLVAFVVAVALVPLAVMSVYVWLIARRAYRWGSPWLGR  
LVLLQLQGFAVLTGFWCLFAPLPVLFHFLAGPFVAGAAALVPPSLLLVRAYRREP  
LRFPVAVHTTGSDVTRPLTLAGVGRAGGGAVRGARLGRPVRRGGRPLAGARLR  
RTGPDDPARVEAGPAPVAAPGGRPDRMNGLDRSVGWGTWTEPVTQLARRGDRY  
FFSPFDSR
- 10 <SEQ ID No.:1277;PRT;Methanopyrus kandleri>  
VFPPCRIMHVVLWSALWSLLWVILLAVYRRSGRPSNRWISTIAGRWFQDLRSRV  
KEVLEAVETAELVDTTFEGKGAPPELDRRLADVLRVPDREVDWRTGLGIEYLGKS  
AGDRFALELALTLTGSEEAVRELVEDGYDVLFPDVRLEGPTGTVSARGVVPLGRS  
15 DGTPVAVVGVGRRGTGRIEVPDSELFVFGGLVSSRRTFSSVLRTFGELLPRGHAD  
RRGARHCPRPPGGGGGAREPG
- 20 <SEQ ID No.:1278;PRT;Methanopyrus kandleri>  
VRLHVLLTLGDVSNYRKPEPWLVEVSLRLTGESPEDTLEWTVEGRKVEVETS  
DRELGTALLALHDGDFVEPGEAVVSTGIIIEDEKREKYEEKVREPLEDLEYGVE  
EHTDARLTEPEGLVDRVCEVTELLRTGDAVFLDLTHGARVMPFASALGLVPALRAL  
TFRRAVLGDDGSLWERVAFSYCISGKEVEGVVEGDRWLVDVTDHVLAWRIRD  
VATYLADPSPRWVDEAEEALRTIRSEPVEVWETLREFARVERASSPGPVHEFVREE  
DVPDRDSLVELVWGTLLRVFLGDVEPREPARRTVSEGPLTPEERRELAARLSEVR  
25 DFLRDYCRYMLDRGRVAAASLMNETHLLRAFAKLVEPFLNEGAYKRARLKRSDG  
ELRRKLKELAAATLDELYFKLFDPPFGLPAARGAIRRILGELGEDVGESTETWESWS  
RSGELLRSVGGGLPLKRDLEERLGDADFRRDPRRLRELAELSGTDDPTALEKPPIR  
RIRNKLQHGDVPVSDRREVHRRRLVELCRAHLEGLTLPLIELLTETVEGRTRGDGP  
GS
- 30 <SEQ ID No.:1279;PRT;Methanopyrus kandleri>  
LVLPLVTAILLTAAPAAAGLQFEAPTAGYPVPEPPHLEDGDGHVEPPFRYAGDHRV  
YPCSVPTAWVFLEDRRCVIAVKPVGGGHPVLLLDVSDLVVSVGADGVRLRGGYA  
TAVRMEPVDFPSLWIPYEVVTGSGVELLFPWLLGPVRECSRTEFERVAELIAGERG  
35 TPPEDVETGVWDELRPSPPLPVPVAVLFVPPARKRRSAR
- 40 <SEQ ID No.:1280;PRT;Methanopyrus kandleri>  
LGIDYTTERVIIHRQRLPEILEDRIIEKYGLDKVQESDHHWRKVSEPALSVTRKLVPR  
IDA
- 45 <SEQ ID No.:1281;PRT;Methanopyrus kandleri>  
VGVPPTSWYHVIHVLAILVVLIAISQFLGTLIITRRSRRLRSKAERILEIVEKAEESDAV  
FRGEGTAEELDRELSSELLKIPDTSVALRFGIAMMNWETKGREDALEALRLIDSES  
LEAFEPYLIPFDVRLRTTHVRMSTWNIRGLIVPLGWSVQRSKRRGRPIAPERTTRD  
RPLRGMSLGFGRHRSRGPETPRVRVRWDYRK
- 50 <SEQ ID No.:1282;PRT;Methanopyrus kandleri>  
VPDPTLTLLLVALQHPTHGDCSAVLVRTHGGYAVAYRRDATYRATLHLEVTTWAGR  
GALREYKLNRGRFCHTVITEDGWVITIGGADDES VN RGLEELGERVVLAGEVTEWD  
LERALDLLRRIGIGHFLVGSPDGTGVGVAVYRYGRTLLEVLRLAEGEYVLVPNDPRYY  
DRGRFEDYDTPVRAAAEIAGLDPYGVNRRDVLVYLVEPRDGRATVRVWVAYDGG

ALLGRRGAGPDPVEFMGCYVPAEWIPRLPDLFELGTVTLGRMPMPTRAPEGNSRSA  
GSPVWWPVPVPAGRPGGSRWRRATDDLHARDPTTEGVRRVGTAVDP

- 5 <SEQ ID No.:1283;PRT;Methanopyrus kandleri>  
LRSSGVLITHLLFSLTLPPIAHSTPVLHGDTATDCLEALTRLSHEARHLDSYHLVLIG  
SPPYRYLTVLPNAGLVTDDPSTNASLHGRELGVRTPFGEVRTTLRAPAVILGLVNL  
DTDVDPSYVTVLWNRVAFLLTYSVVFARLES DGRIELERQAWFDKYRDVLPVYRP  
RADYCEYRFDTRDGTVEVKFYDLWGRTLTVRANLGDENATFDETTADPETLEEIE  
10 SKLAHLPERLREYWSFLLVRTPEGVEPVAITIDPLELAPDSHLAEFLRTLNLADRLQL  
SSPLSLAPALLALTARLYAAVGLSVEIRWGRDDVFERLYDEVWSALPVAACWNLLY  
PLVSNAILKSIVERLRSFGLPAIVPCCVSVAVWEVVTENAVFPVLERWYWGTVSM  
GMAPVVEEPFKRLVAVEFGIPRIVSGAVYGLLEGLWHWVSGIETGPLLSILLDKAAT  
HALLTVLPLPLAMELHSRTFGIIGTTAFQDSIHLLNGIITGVLTGDVPTILDLLYYTALS  
VILENTFGIPVTPGL
- 15 <SEQ ID No.:1284;PRT;Methanopyrus kandleri>  
VAPSGSYEEARSLWERAGEALELARFSLEEGMYRWTA FHAEQAVRLGIKAALAFLT  
GEYPRVRGLSELLGVLVDVTGDRRVRELAGELREELKMLSDAYTAARYRVEFPYDT  
REDAERFIETAERVLSTLGELLREHGFEV
- 20 <SEQ ID No.:1285;PRT;Methanopyrus kandleri>  
VSRGDPDPDWYVKYLRRRYRLFLEYVRRWRYWVRRIAEVIRERVDPRAEVIVFGSVV  
KGRATGGSDVDVLVTERARELRPHEVAGIVEEELDLPEDHPFEFHLTTPEGFETR  
WRRFLDEYERVG
- 25 <SEQ ID No.:1286;PRT;Methanopyrus kandleri>  
VCSARSSRRSSPCGPRSPTAGRSPGVHLGEWTELTVTGSTVQAH LIVGIRGYGL  
EGSFEPVPIKVLVPSDAELVTAKWKPKGGGEVEVEPVSVRTVTWPGD TDQIGYLLRY  
RSEDPLGALFPDGVIRWRELTFVLPVEAKGSESSRCLFDVFKGEYLGTL DVTVTARL  
30 HRGKGEEGEAWFFAWPIPESPNPAYDVKVHGLYVDFVTVYDPETGRWRWFIPVIQ  
PKDRSSTYVYVRVDVAGPVFTFGVETDHVSVETVYPWDERASQFLSLTQYLPVLV  
MKKELQRGEANGETASPGRGGGGAGSTRTGRTVPLVPIVPVRRR
- 35 <SEQ ID No.:1287;PRT;Methanopyrus kandleri>  
VERIRALRVLREYVRRGKKPGLEVYRTVSGNTCGPYVARWRDRSRFKHGRTLY  
LGKPENGSVRFVEWLVS LDREEVLELARHLMRNLRSVLKTLLETVSGLPYQARRV  
LARGLALAFDARPSES PRIRDVLEELPDRLESFTVRTLG GWPAHYSSHLKRVIRSRR  
RSLDGKHEVPDVGLELQRWKL RHG
- 40 <SEQ ID No.:1288;PRT;Methanopyrus kandleri>  
LLPYLV LGLVLALAPASGEPLIQGSLSKDLDYLHEYFQKQVLPKWRDEPHVIADHPA  
RRFCYLP GKDFVTGAPEVRVEPGSIRMEVQLGRRRIQVARDVQGP AVVVVPGVSY  
YKVMALAGQYVCEVGEVILAGRPPRFAAVLKRDDQVIAREDLGELFLADVEYWWYS  
DRVVMRVLGFRPEGGWSRYREGEPLAITVTFDLGGGRILVDRVKVTD AALVERMR  
45 ELSRSLEGPVLGSLVLTGSGVEPLFVDFEPREGDPLVRFIERVFGMYEQGASEEEL  
REVMSEHPNVEFLFPEKGGGTTSGIPVWVLPLLPVPLAGRDDA
- 50 <SEQ ID No.:1289;PRT;Methanopyrus kandleri>  
LTARKIDSWFPVAAVSDECERERDLGSPVEVLPGFRSPVALARAVVLLSLAPEDTEE  
DALLPSLRPIVGEPWRTPIEVPDGDVPRKWWVLGDG SIALEAARMGREVRLVVTDP  
AVARFLREVFGRLFALREEALEEEFLHEVGEVLRDRFGDFYGREDRAYLWIKRV  
RCPGCGLLVPLMEHRWVVEGRYALELDVPEDGDEVEFEVVEAEEAGPGTVRDGR

VTCPRCGRSRSVEGVRRDLSLRAARREEEPVDAYLAVVREDGSRPATDRDLE  
 RFELAREEFREEWEVPRGEPPEGLKRWGIWDVSWLFNRRQLLAHVEVAVATSEV  
 DGDYGIWAAAVLTSLRNSVLSRWDPVTGTLRPRGWTWDHGELPVPSAWRE  
 VSDEITEACRELVEVAEDVEVEVKADEVNRSWSIPRDLPDVLFRAWSELVSNVSA  
 5 GVGWVKVPVSGGGWARTRAPLPVVGGLGWDDRVSLILRGDRIAGRWEIVGWIV  
 GCGLEAASAWPVIGEDALVPLVGREPGPEDVDWEGVVEEVRGSRVRELLREVRDL  
 RGRGWRSVRLIPYAAALPPCTGVDVVRDGDGSLGVRHPEVLSEVLAVGWRELVEA  
 VLELLDVGLSDPRARFYAVYRSLWGYPRPDDAPGREVGPPRLALGLDPNDLPYLD  
 10 ADGRLKTYRERRESRLRPEEDPVDAFHAALLEVLEDGPGSALEALPEEVRGEVLGL  
 ALAVARAARRRGEDHPEAELARRLVGVSAGAAAR

<SEQ ID No.:1290;PRT;Methanopyrus kandleri>  
 VPRRGEPVDTEGRLRETIGRYHGVLDTNFAALAKAFVDDICETPDNVVYAFFLE  
 VKRMMGENFLLYSYEELRAEYAKRLEDLRDYDQGECYACPISELLGPTVRGLCY  
 15 LFKGHEDVSVHDDVLSRPEYSEQLERLYRGLRRGGYAGLPESLRGFKCNFEEGQV  
 GDKHVDVANVMVAAVKGSVLVTSRDRGIRDACSELKPRCLCVYFNPGYVDDPVREE  
 FEFELVPRPGGLPVGLRYRKIGKGFTR

<SEQ ID No.:1291;PRT;Methanopyrus kandleri>  
 20 LVRSHVHIPIPSDPVERIRVLRVLREVHRRGRKPSLEVITYRTVNGSTCGPYVVARW  
 RRGSRHRHGRITLYLGKPENESVSFVEWLVSDDKKQVLELARHLMRNLRSVLKTLT  
 EVSSLPYKRARRVLRGLALTFDARPSERPRDLLEELPDRLESFTVRTLGGWPAH  
 YSSYLKRVIRSRRKSLNGRHEVPDVQLELERWKLQHWRLRPRTV

<SEQ ID No.:1292;PRT;Methanopyrus kandleri>  
 25 MRRTGPGAGAVGSVPSWEVVRRLGEAARRVLGEDARVVPFGSVAKGRAVPGSD  
 LDVMVVSERAPSSFRERARIAELCEEAGVPEDRVDVLIVRPKDFEVWGRMLMTSE  
 SDDTRALVEELLERGERFLRSASEEERGWNDAALHAHQAVELTIKAALIALGEAP  
 PGTHFLGKLLGRLHRTVGKDAFGELSRRYRWELRELSHAWSEVRYGHYPGEDVD  
 30 VGELVEVAREVVEAVRDYVLRVLVDVGD

<SEQ ID No.:1293;PRT;Methanopyrus kandleri>  
 VGTSTLNNLARALGKGDLADLDPGDAYRAARNPEAVEEIGEEVLEEALMELVEAD  
 PKRASAELNTLLRMAERAEREGLEIDSIALIPTKTANCRLCARVVAEYLREEGYAVW  
 35 ETEPVVAGVDPGEFWWGLSDLLERLEDVGVTDPSRNWVAATPGFKPEAAVLTLLV  
 ASLFGKPVFYVHEVMNELVEIPPAMPVVDTPGFVLGLIELRRRLGDGAPEEVAEEVL  
 NDLARDEEERERYKLFLVEDPRSKNIGPSPLARLAESFLALGLLAAKARNYSVEIRTK  
 GHTVPVSRGGGVKKVDRLRELPLEDDTLEVLATVAALEGVDDTWVAGEWTT  
 GTRRHARTVEVLETRDDAVVSVRDRRVHISRLIPTEDPERVARALKQLVGALSDA  
 40 R

<SEQ ID No.:1294;PRT;Methanopyrus kandleri>  
 LRTLPIALTLLLVPAAAHALQPEVLWKGEFPDCPGSGFVHLVPVENEENTALLVVRT  
 FERWSLYEVKGSEVTHLGDVDLATPRSTEVGTAMYYPDNRNELLVTAVIEEGEGPG  
 45 GGVLAIRVGRDGDARKFDGAYVHARPCPDGTLALLHEGHEYLEDEGVHRHDLAL  
 IRLYPDGRAERLVTDFVSTLPPSALLIPGTLRIEPLGDDYLITGSDLVSMVELRRTAS  
 GWDTRYGYPMNLGARITYYLEESTVLDPKRRLVLRQSNLDEPLEGYWAICELVPE  
 SGLGGPVKLRLRVDLGGDDLYFPQSGVKLEVGGSTYYVPAVGASSTKLLVLGPD  
 50 TAHVWEVPGFRELAVTPRLYGARVSERETGGCTVEVCAFKPSRGEELWTLPLFGGT  
 GEGEKKEEHKENEKGKVAIVPVLPAIPFRRPGR

<SEQ ID No.:1295;PRT;Methanopyrus kandleri>

5 VTWVPLVLGLILTATPSAGEPLIRGKASDDIGYLARYFESVVEPKWKSADARIVVDAR  
GFRGRTVDVVYPGLDAFVVPAGGRPRGSVTSVSDVPLSYVECEPGKVRIRLDRV  
GRTVVVEGPAVVVRGLYPPIPLDVSAALVDGYRCTVVGGVQLPIDGGCPLAPRPYVP  
PAAVLEGGGSSDRVVLADGPWPLLDVEYLVGGDVVNMRVQLLEDPLTSALELAIA  
TADGLEPLLWFEVARDDPMMEFISDVVEAYRRGDFGEVGRMLKAHPNVVFLFPE  
GREGFWVYAPQVPLRRRAHRRRIAGTRRRRGSP

10 <SEQ ID No.:1296;PRT;Methanopyrus kandleri>  
LENRLWALTVPTRVGTGGRPGAIDLPLIRRRHTRVPYVPGSSVKGALRTHVEAELE  
KPDDLVDLRLDLGEDTEERRERARLVLFGRDRTKGAVTFGDLLPVAVPAPVALEG  
GKTTPLVWLTCYPVLDWIGVEAPEPDGEALAPSGFPAERVVLEHRELVRRNGKVD  
GVADELVPGPWKPLPLHSRLLILDATFAGLLDPDRPVVTELRTVRVLGGPWDKTV  
EEGALWTEEFLLPQAHPPRGTVRGRRVHAGSDRGARARGPPEGDLGTARRGRFR  
15 LRRPTVELRGGAGMSERSPENVLLSRLREDVDEELKGDLSLCSVLLYGLPGALV  
LAEREDVREALSRLPLDRIERELEREGLPRADRLATRLADLARNAAAVGELPEDEGR  
DRVERLRRRVAAEAAEESLVPEEGVTRTHPYHEKRTLALRALSDGEENLRREVRLLR  
RVVDAAEKAARSDEIRGYVGSYLKTLRELGRSPHLRVREVELRFPHSRLVGMGGP  
HPAENDLTLDPVTGLPVIPTTLKGVARAAGELILRGDPDELKRYFGADDTQARK  
20 RFREVFSGSKPRESEPKESDDGNASESKRAGEVTFHDALPDPDWLRDVSPLVDV  
LNPHYGEYYEGEGPPHESMRPKPVEFLTVRRGSRWRTVLVSERRGSLDVALRLK  
YGVERLGIGARTCAGYGYGEVRY

25 <SEQ ID No.:1297;PRT;Methanopyrus kandleri>  
MRYRLRRLAHRPPSSTSSSPTLLSRTETGEGRRSFPDGLPPQNSASTRRSPSP  
SRKEAATARNALNCPLSSGGRGSGPSRSLTCEVIAGVAKVHPTVRVLNRGPGP  
PPGIALIKLIQGEWRGAGVSRVPKLVTVRLRPSGGIKTWLRGRKLADSLAASWLLGY  
LVYRVYERLCRRLDVERVLRPVLPGNHPFEKKPDNLEPWETRGCVMPPDAVELVVD  
GDVSAEEVARIARETVEDVLEDVLKRGRETWPWRCHNVSLYEPLDWWERTSGRSA  
30 ARVELPPGLIQVSAAVVDLEEDDEEAYREAVRRVASLVGTRAEVMDARGSGGQP  
CSVCGTYPTVGDREFWEELSERLPPQLLKRWEGGFERLCAACLLKRYFGTHVIRS  
WYLEKISWIPSTAIEVAITPVKVGILNRWEELKDDGGFREAALGFLREVLPQLRQIAH  
YLRCVKEVDRAGELEEAADLKRDRLEPEGLPEDVRKELHRLTPKAPRLDEELGDV  
EDSLIEVLLCVEGRFWYDPEAPGGRLLEAGDLENLYTPYYALLKLDGDRMGELF  
35 SRDPETTRGASRATIEFGLKAMRIVHGHYGVLLYCGGDDVFAALPLHTALDCAFELE  
ETFRESLKKWKGTCSAGLAVVHHLPLRDAIDLAYRLEKRAKEAGRNRLAVGLYRR  
NAPERVAVLKWEADGKRPWGLLFELADLVSRRAAYHLPRDWWEGWWHEELDEPK  
NLLRSLGYYVALRHRGEGADEGEIVGLVERIAEVVGKAGPEDGDPGAEGRALEIAL  
ELRSECPAGGNGG

40 <SEQ ID No.:1298;PRT;Methanopyrus kandleri>  
LTARHVAVGFLVLPQDRAFFRRPEPFRAAAESVAESEGPKPWTVAGCVRNALLEV  
DGDLEGEVLEYPRKLVRSAAPPGSIGEALGETALFLGTWVVEVRPGAPDRLERVWWP  
CPAHLARYEPESGGEAVDLLRVEEVGDAAIAFGHDEALRRRYGFMTPKPPRPGS  
45 DVETPGRYVDTGTISKILAGRTPARRTPDLEDNVAGPGELLRPELVGVKLVGLKTA  
DEGYLYAARFLRPGSPVDGGSVLGFLTAVLPEDAWDDGVLEDLPSGGRLGRG  
RHAWVIPLRAGDWSDDVFPEVEEPEGDLPGLYLETPTPFEGDVRSSSPGDRKKA  
EAVLVRPGSPRDRVLQVELEVSEVESEVLADRVITRRVSTWSGKRASPDHLAAAE  
GTVLALGKLDVDPGTPLLLFPRMGDEDELLASRLAFHLSGVGTAYALSLPGVSP

50 <SEQ ID No.:1299;PRT;Methanopyrus kandleri>



- 5 VTDALPYFLVCRTPTTRAGAGQQRATDVIDLPLQREAH TKLPVIYGSTLKGALRHATLR  
KLSEELDGETSEGLVDAVFGDRPGEGSPSPGVVAFSDAVLLAMPVRCEPGFLAWV  
TSPYQLGRLYEVL ELTGELEDLREAVEEVLNDCKDPRGNGALAPEEGTLLDRIRVR  
AEASDAVGDLAGVLSETVFEGAPEPHFRRYVEERLVVLGDGAFADLVNSCTERVVR  
VRLNEEKTVEQGPWYEERVPEGT VFFGT LNVRHDTVPPKNGVDARKVLFGRWEP  
DGVDPDGDDRKLEALKEAAGELEAGVLGAVADGSGDGYLDLRFQVGGSETVGFGLV  
RLRQFVGE
- 10 <SEQ ID No.:1300;PRT;Methanopyrus kandleri>  
MPAPVRSVSFGRPSGIEGTQTGGEEGTGEKP EEKEGTEEKPGEEKPANGVGGGT  
ETDRTRETSTKPEGPGKPTGGTEGTGGATESSKNGTEGEPKPSEPEKPDGGTGK  
GRKNGGESEGAEGVKREPQPREPKGRRLPVWWVLPVPTPAALRRWISA
- 15 <SEQ ID No.:1301;PRT;Methanopyrus kandleri>  
LRPATVAVVLLAALAPTSALDWTGSQEYGAIGQE CRQAVERTIWWFAEGNEHLN  
AAFDATYPVLF AAERMDSLASRVPLHVPASSPADTWP AVRIGLLLYPTFRDVNRLL E  
PILHETVYQGLAPVTDRDVIREKILGLVEAQDDDG SWGRWREEKPEETASAVELLR  
VLQFRDVVGGQLGLDDTAFSEVREAVERGMAWLLGHQGS DGGFDQDPADHARVI  
STLIDVYRLADRLGLDVDRDGILNAV RKGLEWLFSAESGVTWEDVDGSHGPVWTR  
20 NGSPDVRTTGDVLR FALLKALWYDIATDVEVDTPGGK RKLRLIEDPEYDLHATVR  
WLLKGQVATTGPEYGSWSDD EGTAAAMGALEAYLNPRVYYDGYWRPADVRAEM  
ELFDVTERGTTLVLR YRV TGEVESLKATFYEDYGYHGCYEVWSGELRSGEGLTID  
VDGHTLYVFRIVARYRDGTVD DVF AVAGLKIPLFAGIESSDTSPVRVKGSTSRALLVS  
GGLVGEDRDPGGSRRV VPRERTGGGPGGAGGEVRGLLGDLP GGPRGLPGGSAR  
25 EDRVAR
- <SEQ ID No.:1302;PRT;Methanopyrus kandleri>  
LECAWKVYDRLRNESENKR RMGHYLGIRRYSR SRVHFQVKRLKNGEFVPVVTAF  
AGRRKERGNLKGVRKAMGKSWTLYP
- 30 <SEQ ID No.:1303;PRT;Methanopyrus kandleri>  
VRVRWVLLPALLALVLPVHGD AWWGPEALLDVGVQSDLI EDVHLKESDHGVEVV  
DHVDAEYRAYIRVKEPGKPVTLHVLLPQGTEVLEARFYPELYPIEGIDL DSPDVNVK  
WERIEPVSRS EVTWKVLGWTWRWTQLDFRVTPKYDERRHGC SALVLKLRIP TAHR  
35 EPEEIDRLPIAGPKHYPELGSYYYFGCIEWPAPLQPSGRGGGFNCWATSDAWSPH  
VLFLWPGGFADIQEGFTNVSLTDHLVLT LGGSGGGSGAAVDVVG VREEGERVVQS  
EWPRVTGRFGFPYVPVAVIGLEKKEPSSPKTGRKPERE KPAKHELPPVPPVPPPM  
RGRRRLTGKASNSSP
- 40 <SEQ ID No.:1304;PRT;Methanopyrus kandleri>  
MKVTTTRTTRGMEPPVPPRFVSTRGTARPPYTYRKAYTAGRIRGSAGVEGAPDIGE  
RSTLLALRWLELFS DVWIVILGLTTAIVFFVFGLLPS LLLL FVLL LISAPMTAPVRFVLS  
TIPLIVLWSARLADREVIVLSVILLIAALWSARSAGRKVVREASRIVEEAEDIVGVVFR  
AEGTPDKLDRRLSGLLKVPDRDL SGGKGTQFVVGSRGYIKGCRGALREALKIVGSG  
45 DALREFAEEGSLVTFHVTLVIPPTSRYEFKTEHDLRGIAIPLGRRSEDRAPIVALLGV  
GRRGSAEDWTLAFGGV VPLGETFSELHPHEGRTDDGHGSRHRDHDGDHNGWC  
AGGDGLGDYHWWDSDES GGIFESIVDSIAEIAESMEGGWGNGGWFGDGGDWGD  
GGNGDGGNGGC
- 50 <SEQ ID No.:1305;PRT;Methanopyrus kandleri>  
MGFLSDAIDK VIRGVRRGRADLKSVRSALLFTPWVSVITLLALLESMSFNDLPRLSF  
GLIVGLLSSSPFQVLGSRMVADARYLGVLSPVIGVLALLAVVYPPVPYLLSRLLSESF

WO 03/076575

- GLKLSHDVVLAAELTGIVYTLTCMVAASWKEYRWKAVLQIVASWTAFSVAFVLA  
 TSDVLRSFVLSSSLAITLTASLVANARKHLENPPEITKEYLVGCLVVAALDYFVI  
 ALSSIAYYAMMFFDKIWIWCGRGFPYPLDVPASVGMVPLLAGTFAAGIFWIDVGDD  
 LDRIYRVESRELEEIGRRMFLQFIKGAGIALALSGVLALVTASFVRPRFHYWMSGDV  
 5 AYLLGPVLKASSALIHAVSAVPVPPFGNLTATLVKWIERQLAGANPDLLVYLLGSPVG  
 ALVVYTYPQLITFRREIEATVALSLVPIAELLAWHRWGVKWLALGYLMGTCSATVC  
 ALTAVRMWLNHTEAYRVLSYNNFVSIVIEVQRHGGEVVRPRDPTIRG
- <SEQ ID No.:1306;PRT;Methanopyrus kandleri>  
 10 MLGGPEVTIVTEGTYPALGGVTTWVQRLIEHSPNVRFNVLCAPPKGKTEPVVDIPE  
 NVRDVVRELVPRRMGKRRWAARVFPVHRIRWLLGRRGEWAPRGFRVLERA FEYI  
 LEGEPLLEEMLKRLYEVS ENPVKVLEGPTVYTLARYVEDQLGS DERFSDLYWAVSN  
 VCSFVMGAASGVRHMP ECDVAHPQNC GVC GFLCAIRKAVKGTPYIITEHGV LIREL  
 DTRLEGLGDVARELYRRCFESMIETSYRYCDEILASDYHREHAVKQGAPEDRIDVIY  
 15 SGIETWRFPPPSDVERKFREADRLHVGTVARVEPIKGIDVFVRMAARVAKEMGHDR  
 VRFHVVGPIDDREHYERCREIVERRGLERVVKFHGSQSPEEILRFYHKFHVFLSSR  
 SEGLPMALLEAMSTGCPV VASEVGAVPYIVKEGIGRTFPAEDHEAGARALLELLQDP  
 EALLRMSYATATREARRFDVTRMCEEYTRRYAKYAVPDPG
- <SEQ ID No.:1307;PRT;Methanopyrus kandleri>  
 20 VTRWRYWAERIAEVARDLLGGRTRVYASVEGDRLRVIVSGNAPEKPLERA EIVAEI  
 ERELGLEESWAHP IEMHVVDPEEYEALWRGV LREAVEVRT
- <SEQ ID No.:1308;PRT;Methanopyrus kandleri>  
 25 MPDCGTSSRVGKSYTVGRVVENLLTAGEASYICFYVAPEPLDDVERVLRDKLSGS  
 SDVLR LKDLGDYECEIPVSEFLKNFGEDPKLSSLPKCTPEFYEEVYRRADGDPMEL  
 GRWGYFERLREYVEGPCTWERC GDCDVVRDHNFMVGARKVKRGVLLTYRKL G  
 DLPRFVESRERAMREEGEEPHMSVDRLREVLSGSLVVLDDAHHGLVRSLLAEVKE  
 GIVRDSLRESLGGRLVHLSTWAA LDRNPSEDTRGKL RDVVF GDYAEKVREVVES  
 30 RLEEWIESVKGKGRVRV RALLELDHAVRTGEEVGIGGWIALATGGGVFAPEVDS  
 VEKALELMLGEYYGLPGAYVVIANRPVLERPSVRVSVEASGEWRAYLLPLYLRKEK  
 DVGLILEILTRLDLRRHRIAFLDRAETLVDRIIEGLRRLRRDGR LGVEFRRL ESCNDLK  
 DVATARRGALGVGTGVGLVGCEAMGISGFLIARQYLSSYAPDLSVALLARRCEV  
 RGRAERLMDRYGFSEEDATVAALRLTAFEDVLYEMITVAGRTAQAVPEAFVAVLGA  
 35 GSIVKTASEHP EEEVYRGVKDAFGGWAPRVMVYDPRTDREYDLIEDGSELPEPT  
 YLRELDEAALDNLVMWLDGKLSEVP
- <SEQ ID No.:1309;PRT;Methanopyrus kandleri>  
 40 LVESHAVPIPSDPVERIRALRVLREVYRRGKKPGFEV TYRTVSGSTCGPYVVARW  
 RRDSKFRHGRTLYLGKPENESVRFT EWLVS LDRSEVLELARHLMRNLRSVLKTLLT  
 EVSSLPYKRARCVLTRGLALAFDARPSNSPRI RDLL EELPDRLESFLVRTLG GWPAH  
 YSSHLNKIIRSRRKSLDGRHEVPDVQLELERWRLRHDR
- <SEQ ID No.:1310;PRT;Methanopyrus kandleri>  
 45 LGVLGGPSPRLRLYVYDFKEPGGEAERRKLRELLESHGAFRLQYSTYALLAEPEVH  
 ARVLRVVARVD FEEGDSLIVPMCRRLRVARWVDAEGVRGLRF
- <SEQ ID No.:1311;PRT;Methanopyrus kandleri>  
 50 MPWRSNAVRVRMDFEVLRREDYHDRGAARGAVKDHLREREF AFQVDTVVSAGD  
 RGERVSWDDLSP TARAYAVRAALRLGLEGLGFELDTGYSLLCDRDFFEVCYGGRF  
 DGERIPGVYALGNWREVRDRVLR TLGREYGPVEVRLGLEVRARALGDGTVLLSVD  
 PRARAI SRVRLKDLVRDRGVGWAERVLP GTYVIPTDGGLTGRRLKVVD AVPAD EW

- EGEDGWDLERLREHWSGYGVEVDPEVWTVKVGGGVLHYPDDVLRWQVPVHPV  
TEYFRLGVADRVSVGRYLLDRGLGEFRRRFPDVAVEVREHPGSTDTRRVPPAVV  
AGGEKRGKRTENDLLWNYGPYEGAGELDGEAVHLVADRELPGRAGISERDLERL  
LELVVGRLLRLLGHDVEAGDVRVADAVDLPDLVGDADGPVLVGVLSDDDRTYARV  
5 KRRDPLVQCFTERVLSDGKTVKYAATVLAVGIHCKHAGQPYAVRATSGPKDVAVVG  
VDVSRKVEGGRVVEGRACCSCFVDEDEGLIEHGRTFTVPVGERGETSGRTAEIVLE  
TAREYSDRVVYLRDGTVPGEELAVREVGLDGLDVTVEVIKSDPTVYAIEGEGW  
RAPRGAYVRDVGSTVHLCCSPYTPRRRGDKKPGTTPRIALRRRDDKLDGDLIGLVH  
DLTASNWGNPSGTWSRLPAPVLYADRASRLARYGVSVGPDPVSERPWPV
- 10 <SEQ ID No.:1312;PRT;Methanopyrus kandleri>  
MGAPNDTVIFLRRGKIERREDAFRIGKSKYSAVRTTGIIIAGGAQITTQAVRLALRNEV  
PIVYLGGNRILGVTVPFSERYATLRLKQYEIASQPSARLAFARPLIASSILARAIVLEFL  
ANETGITGLEDAADEVRSEAERALNAGSTDALRGYEGRAACRYFRALAEVLPDWA  
15 SGRRTRRPPRDPFNAAISFGYAGVLLPVLLSRTVAAGLEPFLGFLHGPRGRRPGLIL  
DLMEEWRALAVDVPVLRRLDGLSLSREMFRWKGDVALLRDLDAVSAPVLTVLSRV  
RGGLEAVDRRIREVRDGVSRQSPPEPLEFDPEDVGVVWDALEV
- 20 <SEQ ID No.:1313;PRT;Methanopyrus kandleri>  
MRRAFPSTVLPVALILLPLPGHGAVWVDPEVLPDVSVKSWLIVEDVHWKEETTWHG  
DKVLDYVDAEYIAAISTRNPGKPVTLHVLLPPDAEVLEARFYPEIEWGEAEVPPAE  
WMIYIWKWERVEPADGSEVTWEFLDETWKWTQLDFRVTPEAHDSALVLELRIPA  
VHRVPDLQMVPEVWNGEGISFPYGVKLKYLYDIGAVEWPVPVQPYPAAWCLDCAL  
RTLSVKVELFVWPDGVFTHVPEGAPWTSYEVHVMHMLALGDVVTIDVVGIDPRK  
25 MSYEEYERKRAEVVRSEWPRVVERFGFPYVPVVMVEIRQKRIVFDISLTPDPVEA  
GSEVTVLVRPLYWWGPWCADWPWDCWPEEGVLRFLKDERGSVTDLGAVEL  
LPGGYVDGGLVMFRFRAPEEPGDYTLIVRYEGPYGEYRERLSFTVKERGRRDGQG  
RTPPSNPPEPPEQPPEKPPEKGGKRGFPVLVPPVIPPRCRARV
- 30 <SEQ ID No.:1314;PRT;Methanopyrus kandleri>  
VERVALAGLLHDVGKLPQRSGERGSHQKLGAELLKKAFFGGREREDETLGLAVLAA  
RYHHSDSLGDARPSDLEVPEDWGLELAVVALADTLASAERGNNELDREEPRGDHR  
GYWTLYNPWYRIWEAFRRRLGGEVPGGWGWTEGRPEFVPDELPLHLNVDPRF  
EPPKVVEEGEGYRGRYRGLAGRLTEWLKGLGVRDHPHPFDPARVAMEVTTSLVPA  
35 QHYIPEGRDHMRISITLYDHSLLTASLASCLWYLVEEGHLDGPEDNPSEAYHRLRDG  
LREGGRSFLVRGSLSGIGEFIRSVRRASPLEERRRTASYLKIIRGRSAFVDLLTAGA  
AWTVLRETGRDAHPAFLRAAGGSFTLLLNTTEEVREALEAVREGLKRSVSEGS  
GVLSLGLAWVELDWDALMRRERFRERVEELGRRESEDRRAVLPGRTTSRVEE  
PCPVCGSPVPEDEGCEHCERLGDGLDSLVRDEEDRPVAFGLVYEDRDGSGDG  
40 GDVVHERDGHRYRVHHVTREGLGGAVSVGGLLLVDPAHVEEALKCARKAAKEGKS  
PARVVMYSYFPWYAATKDDVPESEEGEIGATFSGMAERSPGASLLGFAYVDVDNLG  
EWWREAAGDAFGVLLSISRFTDLVFRHWVNALGFRTVAELLDDVPGLEVRLADGGR  
ELDPPELLPRFGEDGEPEPEHGEDRGRPFLLVYSGGDDLLVAGAWNEAYSLPFEV  
FLLFSHVTGYLPVASLSGAVVLRKKAPFHLVLRALKAREREAKRAGEGDDPVRVR  
45 LAPKGYVSLRLRLSVSKSLNVKELESSENQDTHPVPGPVRFDLALAAVDMKDVVG  
ALDRKARAYRLRLRSLWWGRGDVGAASALAYVVSRLMEDDSGVDLSGTLLSVLPV  
KPPEDAELYPVGLFDVALIPHILARRGG
- 50 <SEQ ID No.:1315;PRT;Methanopyrus kandleri>  
MGADLRPAELAEYLYKPGRLDRNRREDAERRFERLLNDFKAKRIQLKPSDDGLLE  
LAFFTALVSLNVSNSQLRRLYAEITNVRNETRRAREGKGSWEDVVAALGKARVVLA

YTKGRQGKEFEGLYEVLDEALRKATKIVEDSEDDVRRRAIEALHFLAEGIVAFHRF  
LGGRS

<SEQ ID No.:1316;PRT;Methanopyrus kandleri>  
5 VVGIGGTITLVGEIRLRTGTRIGTSEEEIEIGGLDNPVIRDPVSGYPYVPGSSLKGRAR  
ALFELAWMKSREIEPDVFFGAHHNERHECGFVRREVYEEAKEYLREDPPWLENGT  
CPVCRIFGSAGDGIGFSDPGRLEDERRGLGYDPYGRYRDPNDAQELSGVVDVKKE  
ARVAFRDAHPTTYTVNDVFERAGEPTEVKHENAINRVSGEANPRSMERVPKGSRF  
10 GLEVYRVEDGEELESCLKYLMSSKLVEDQGIGHSTSRGYGRVEFRIAALCARST  
GWYLDPGAGEGFPEEEDKDEAADEVTYLSDLEAERYEIVIRARDLEDRAYL RPEEW  
VERLDEVVGELPWGR

<SEQ ID No.:1317;PRT;Methanopyrus kandleri>  
15 VELVLELSLGRFRAGDAIERTRTSVPAQTLFGAILGATLELLRGDGEDPDVVKEVLD  
ALVGGLELTDAPFLDRGGEP LLPVPEHVRRELS DPERYGEVLREL AGDDVDTGTHG  
LVTEPERLPLSLFTDLCVEGSPTDPATLKRLREWLSGEHDPVVGSGRLTHASVPRT  
GDDTTPFTLDYASGRGIEGPTHVAFLRYDGKEPDYYDVEALLRAVLRYLRDAGLGG  
ARSRGAGEVLEAGLREPEGEEKLLFSQRMVVEEGEPAILTSACAPEGDAEFYGRVE  
20 RRGHLHYARVGPFTNYRVPRHYLAATGSYFPEWPGAENLRFEVPEGLLPGLRGD  
PMYRGGYELVYGRGFPVRVRALGDGD

<SEQ ID No.:1318;PRT;Methanopyrus kandleri>  
25 LTVLLVRNVGVNDVRVDGERVNEPYVVKELVESGDL DGVSPILERVLEELEPDRI  
VLFATDQDPGSTPRHLKAKDTLYVAEAMRELLDVEVEVRVIRENPSDHDAMLELYG  
RELPEVLDGAEVYLDVTTGTPAQLALALKGLEVEPD AELVYVSESTGTTRIRVGD  
ELLRRIADELLEYGLNDPAARVLSHTGLDDLRTYAEARAAEDRFEFERARELYRGLP  
EDFLDVSDRLERVERALSDDPVERMAERTRYVLDRALTHLKRGEYGEYVLR TCVA  
QEMILWTTFSAVSGREPDPDEFVRHASREADWDPKYGNLGD LIRDPVSTLARYL  
30 GDYLEDLTSLEVTDAGRAAAVNALASYVVKGLREL RDDYAHRAIRITLEDVREALG  
RSRVDSEYWERKHGHGPDFKFPSEDDPEAAVEALRECVDAIERAVGR

<SEQ ID No.:1319;PRT;Methanopyrus kandleri>  
35 MSGLETVEVRLEVL TPLHVGVPREEELVRGLDYRVDGNRILVVDFTTLPPERAERV L  
GALEGGDHAEAEGLYGAEVLREVELRTGGVPDRFLPT YRPTRVDDPWIPGTSVK  
GALRTGLLLAALKRLDGLGTDLSTLDRLPNPKKA AVALDNRLRATVFQGGTARR  
SYRRKPNRGWPEVFPHADVL RALKVEDARPVGKIRTAVYRAELHPKGRPLDAREF  
VMSGTFEELGTDH GELKRVLDTWDRVELPRLPKPVFRFLRDVRSGLRDFWEETLE  
NPETVLERAREGWREGLRALSERFRVDVPDDADVQLGWGGGRLVK TALPLAGRV  
40 LRGPLDQFAPQTVKLV DGEVPGLVRVVEGG

<SEQ ID No.:1320;PRT;Methanopyrus kandleri>  
MSRPRPGSRGWMLMSEGVFALIVILLTFTATVGS IHFKHTHPRKQNR LTRLSHARCI  
VVVTEDLCGGSRYSVRLAEMLRRGVPM TFAVPAWEAYAYPDRMRKLRELGGDLI  
45 NHANDGGASYAFLGRPGKVAGLPVKTQRQIIHTTQKWIHRATGVRPD AFRAPGLAI  
DENTYRALVEEGIWVDSSKIYTRPGTRGGAQVDRDRRPPDPRGTHSVLRGVAVRA  
RAAGGAGVPVLVRRRPVRASQSDRSPPRRRWRT

<SEQ ID No.:1321;PRT;Methanopyrus kandleri>  
50 VFVVL FHEHITANPKYWWIILEFVDYARSHPGVAFATIDEFAELARHGQRFTAF

<SEQ ID No.:1322;PRT;Methanopyrus kandleri>

LKGVTVRFEGLTALRDVDLSVEEECGSSSRASTWPRVAYSRVAFGMRYFPSAEGW  
GFVLLGTVASASVGALVALLCREEKSASAVLNAVASPMFLGAVVVPENLVPRVAF  
EIFHRYPPVTFIHALRATDLYGKPVAVADVVGTVLTATVFAASALVFRRAARELRRCR  
NSGL

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<SEQ ID No.:1323;PRT;Methanopyrus kandleri>  
VRVVLVYDDRRGRRGFRPSWGFSCLEGRRLFDAGGRDRILLHNLQEAGVEP  
RDVELVIVSHDHDHVGGLPGLLDGNPGITVFASPSSELDVRRVNRVRNREEVVS  
VLAVERPNNVGLLLESEEVLLAAREPGELVELVRWVCERWEVETVIAGFCRYPGAA  
RIRQVAEVLGELGVGRVVGCHYFRPSDARHFERWGIECERPGVGEELEL

10

<SEQ ID No.:1324;PRT;Methanopyrus kandleri>  
VFLTGVPLALWGLRLIAAGTGLPLPLVGALAWLFQWVFDENEEDVPPSYWVLPR  
VVLSPPTWYLERALESPDTLLDYLLTGAVVSLPLPLTQLVWVLLGGPTGVLEILDY  
LVQLIGEIMEDPGRTLPEVILWFLLPVLPHVHVPTWLAALGGLPALLAHAGGLLLAP  
HFLTHAPAVTFGATVTVSRGGSCPTGVRNVASGSPSP

15

<SEQ ID No.:1325;PRT;Methanopyrus kandleri>  
VIEKVLADLNRVAGVNGSMVASSDGLVVAEAVPPEVDPEIVGAIATTYVSGSERVIE  
EMELGELKQMLVESTDGKVVIIRVDDDALLVLIADPDANLGLIRLKAREAAEEISKQL

20

<SEQ ID No.:1326;PRT;Methanopyrus kandleri>  
LVEPIRSLPGSRTRVKLTRECIVIRERGETRRIRLEDVVGVEKHPRRASKALDPAEDT  
RLVLITGDLERLVLLVRDGRLYWGLKALLAARDGETDRLIRYLTLLRIAGHPPLER  
RDGRVLLRWPWLELELGSPERAETVYRELLSRWEELLESDEKGHDLDREARPVWV  
ALSVPLAPMVMTVGVHRRLIAQVSPVLIWGAKLAVDVLERVLGKGPIQCSVAWESV

25

<SEQ ID No.:1327;PRT;Methanopyrus kandleri>  
VLCGVGVGLISVVPWLALFAFPYWYLARHALPYVDGPLRFELTRRLGTMGAVTGLW  
CLLAPLVGMYAPAVAIPAAAVSIVPAVRVMACLRAPSEFTIALMNVGTWARRTSA  
AGACVALVATALAGPVVGGLAELASAVACAYVVSRRVGIASHLAKRVWIPTDRCSG  
QRPAKG

30

<SEQ ID No.:1328;PRT;Methanopyrus kandleri>  
VGVVESTEVPIFRDQEGKARALILRYDPDGGVFVRYGEREDGSWEWTGFRLTAAE  
VALLKEFFNRIDPLHVQRLESGRDRG

35

<SEQ ID No.:1329;PRT;Methanopyrus kandleri>  
VAVDRDLCPDADLRKVVEALGFFFDPVRAVGLALNLRGHMCFVDGPGAGKTTFLD  
AFSVAVVSGEGVTREAMVWDERTDRPGVVLHYPAGFVGWDECDSIGSPVRKLV  
EVLDFRLEVVAHAGELRTVRHNRRFLFAGRAVPAPFEVDLIRFLGRMQYIGGVGGDIR  
DRVLSGAVDPRAVEALYERISWDVQAVHLAGCAAEGPFVSGEFAEEIFRGYLRERL  
EAFAAALLEAAKRFPAGAGLARKIAMAYVQDKINRFADTVIAFGGPEAVADVRE  
YYALCDLEAPEDDVECLVHAWVNALMNNYSQWCAEGKIPGPKIAYETIASEDDL  
RFEDVVG

45

<SEQ ID No.:1330;PRT;Methanopyrus kandleri>  
VLALLALLAAQPAATPTVDVFFEGPPDEDHADILYLVVSKPGTVRVYLPLNSEVR  
GVYWFAADELRTVDGLALPPRSEWGRHEVRDWRLTSEGLEWRDRLYAPVGDDW  
PVRVPIDGIPETVRNAFAGLLERGYADIPVLEARVDPGLLVVEVRARLVSNHLLMYLV  
PGYEFNAATYESDNRHSYYLEPTDYGFIQGVNVPTFEPALVAFGLEDLREYEW  
PVKVNWGWVEREGPPYRYHLFPALVPLVRRRLAVLLAAIALLPAAAHANPRILPP

50

- 5 SP PPPV FVSQITVLDGGMKGNLHEVHV FVRLWPGTEGTVYVPREARIETA AVVPAD  
 AVLSSATAGDVRAWCERNHSPAPETAETTFELPEEVSVITWWDEEFRTTRDLFLES  
 RLGRAMKPLLDGVLALRV RADDSDFLYDLLVPAGWRYLPLGVTSSLLHPFGDPIP  
 ALVRAGDRWYASYANSELLRSLHPDLFLLLNVEGSWGTRLNTEQLWEKELRRRLSE  
 10 GPETVIVRSVRGDEVLDVVATVPEIPLPAGSKILKYGTVP RDAYRDAYTGV LAPGF  
 QPVQYRVVREGEMNVPDGTVEYRVVRVDVSPDRLLVIRAI VPMKNGKLVIPVVG  
 GTVLGSSYYDRKEAGGFEWLVEEFEDLKGF RKFEPRRGWDRRPKPLEVLVGLLL  
 TPLLLYWVSTAFGGDTGSPLTVVANFLGELVVD SLP SPLREALKPVTRLVG YCVIFLL  
 GALTVAQGS LPL
- 10 <SEQ ID No.:1331;PRT;Methanopyrus kandleri>  
 VRRVLSPAIVPIVVLVLPVHGDSWTDPEALLDVG VQSHLVIEDVHEKEVTTEHGD  
 TVKVL DYVDATYMAVIKAKEPGKPVTVHVLLPQGTEVLEARFYPKVS DRSPSEVLSD  
 PSRFESVKVKPKGQTEVTWEFLDET WKWTQLDFEVTPEHDPGKPFYSLLVLKRI  
 15 PALHRVPNLRMYYPKHYDDALRSEYSYGVIEWPIPAQPGYDNSFYVRSGSETLDVG  
 VELFAWPEGVVTKSSAAPGWDTCQARLTDHMLVFPEARVAVLADVSPAEDYEKW  
 KHQREEVIEKEWPQVTQRFGFPYVPVAVIGVERVEVSFDLLVPERVDAGSTVTF  
 VRPYPEPWSYAPEEGVLR FELRDEHGSVMELGEVKLPEGSGFEGWVEFRRAPE  
 KPGYYTLFVEYEGPYGNGKTSATFRVEGRGKRCKLPIVVPVIPP RRRARA
- 20 <SEQ ID No.:1332;PRT;Methanopyrus kandleri>  
 VGGRVEWWPEPPSGRRARESGPAIGRSVLLLAIP LLLMVSPVSGVTYVVPDVVD  
 GAFSLEKEGLEHATPVVTSGPVERFNTFENMVVDY EYVSVDNHDLVVC SNPFDEI  
 25 DVRITPEGIRVEYQTSRGTVRRSLSFNPEHTYLV LGLQGLRTIPVEPQQGGGELPVLI  
 IHDHRVYEPTTYFPSPILGRYARDVTPLAQAVELMGGYDLLVRLEVDGSTVAFDLVK  
 SDG
- 30 <SEQ ID No.:1333;PRT;Methanopyrus kandleri>  
 LNTGKAWRESLPPEEARKLLDLARED LAKIPQLKS GELEDESGLRLVYDV TEDKVL  
 LLLARPSLEFIRGHNPR LAELLHVLESTADSLLEWDIFQLSARAREVKDLLEGAGLAS  
 TGAIRYLLHPELALGTFLLTSGFGFIAFLPWIELLKRFPR LGEAEFRWEP SALLEYAR  
 RLAYVGVLYGAELAYWTCCEIAVKALLRV LGLWDYTVNGRIFDLADSDVWAP LLEE  
 PTKRLMSELSGLPRPLVGAWYGLMEAVTKREIGPGGVNVRNAVLRVVGHA VCATL  
 35 PLPLGALLHSLWADECDFGDRFLEYWPGVLAPVLAVLGALAENALTGW
- 40 <SEQ ID No.:1334;PRT;Methanopyrus kandleri>  
 MRARTHVLLTYLLTAPFLGVERAITASLSAILPDLDHPNSLVSSALYPLELLTGRDLRL  
 ALSRRLRHRGILHCPWPWGALAYLLWATGHPNAALVPLGGFLHCLEDAFTTMGVP  
 VMWRREGGSWRSVRLSLTGLPSDTWDAILPPLALAVTWALFLLNPAEFHATHLDEN  
 45 PYLERAYWTSRAVLLRPFLHTVEGLNREALRVSGYGR LPHVRAVLRYDYGPREVS  
 GLWTPAGWVRGDDGRWYPPPTHGYSLRSLSYERAAYRVGT VRCWDAPEGALVL  
 RAVLAYEGLSPVALERLAREAVLLGFRVRHTDRVGGHLVLEGGGLAIPVLHRLPRPA  
 WCRVTFLPSRSLR
- 50 <SEQ ID No.:1335;PRT;Methanopyrus kandleri>  
 LTPWPLPREIEEIVRELPPGAYVASARVEGVPEYDLLSDALRDALGRSSTSPYRVLV  
 DRYLEEVDAPLVFQASNHFQLNHHARRALERLAGSV PVLVLNRGYLPAVECEDLTD  
 ELAGTDSAEEVAVFDDGRTVTLVEDPSRLLRALAVAGIGLLILRTTVDESVD FWALTA  
 LGLAGLAVSKLG
- <SEQ ID No.:1336;PRT;Methanopyrus kandleri>

- LIPTLLGLLLLTTPAQAADVPADPTLGAGKVVVRFTPSSSGEWLAQAYYSPPRGKLAI  
VSVSGSIAGSRVELRDYAGGPLRVSVVDVSEYAPELSQVLTVPVRVERRVTREGST  
YHVTVIVSNEAHPVMVRLTYSNWITHLDFGDRTLDDQDVSVVLEGEKLELEPFVSRD  
SRFVRADLWVTDAGGFRYPYTRLGPGDSLTLHLDVTADRSPGKVTVTRRLLS DPP  
5 VPVSLTVSVLRPANYGLDGKKVSFWVPAPGVDYLVRYLA REGDRLVPKSLEGE  
YQGVSVVELQGEPELVSVYKQPARMVFEVRDRVKLSLRSGSNGSSRLWVRWAS  
ESIPGGLATDVRLKGRAGRVLLGLVLDSTGEANVDVSGGTVLERGTLPGRAYAILD  
AGPVNGEKVVRVTSNARVLDVLSKVVDNPGVA
- 10 <SEQ ID No.:1337;PRT;Methanopyrus kandleri>  
LLRLIKRILWGILSYLHEIILELLLAIVDRTIVLLLPIRLPYRLLLETVRRALRRGLTGT
- <SEQ ID No.:1338;PRT;Methanopyrus kandleri>  
MFLVRVLLTDPVGPHEAYGTVPPPEAWSLLEVVLQSLEGRIDRLLGLELTPASVALE  
15 SIAGDVGVLTTSTDPEPVVRSVRRVFGSCDVEGVYREDVGEAREELEDMPEDTI  
VSRELDVLGRDWCVLGAGTALLSGGKVPAL EEIRPGEIRAWNSFSREW FRA
- <SEQ ID No.:1339;PRT;Methanopyrus kandleri>  
VVARWAVTIPLILLTVGPVAGQPILQGSSSDDWVFGWKYVRSEVFQRWVDAYSPD  
20 GPPVLVDAENMSAPDVLVLPDRDVFVCGTSEVSVGPGRVEVSTAADGFRESTSL  
DVRGPAVDAWPDVLAALLDDTVCELRLREGQMPPYEAVIRKGEREVARETLDME  
DMLREVVEYAVYPDRVVFRVLGRPVPKSLNPSSPPNRRVIVYTITFLPREGRILVSRTV  
SRDPRLLYRLAQFASTYSPTVQVGVLKTPSGALPLFARFQPPWEDPIIEAVDRAVLA  
WRNADEAELREVLREHPNVRLPEPWWRRSGGNSVWTPLPFPAPVRPGRRRLRL  
25 AALVLLALPLAVAPASATTVTGGALGDYQLLHECRERALQELTGGAHVTYVYNPSG  
RSYTCTYRPEDGSFVVGPSRLSPWDIAIQPKLPDPAVISVGKYLSSYLVIYHAGRTY  
LVAPVTDLGPVVYVLEGDSVRAYLAPEWVSTLVGRTRWADATFELSGRGCTLRYYL  
IRDEDVVELTVRIDFSAERPEFWGRVVS DPRAIKEIERAERVERLSGRVGGVVMHS  
LEGTRPVLVTFELPEDHPLRRFIDE GIDIATDPVNTSMSRLLSWWFEWKRRFPNVEL  
30 LPDPSDPTAGTLC AVLREPWLAIVPDLLTAVCALPLDLALTTLERRLYDALEPRVEP  
WIRDPLGRFLAAVAYYVPVGLLEELLGRLLMPPVRS AVIPVLPVGLRVPEWDVDE  
DVKELSERALYCAVAPVVDTVAMHRVAELVGSPVIAAFTYALLDTLWKDRGRWL DV  
GYWLAFPVTILLPAIGGSVFSLLWSSLPQPLAALLYGLRNTRILTSPPAVPGSVHRL  
VQVLTAVALTWTPLGAPT
- 35 <SEQ ID No.:1340;PRT;Methanopyrus kandleri>  
VRLPREEVLTRVLDANAVDLYDVEMLFDASYPGGKVRAYSVLELHPPREGALLHPQ  
LRPRRHV LGPGEVRPREALIWGWAGNEPVVRLLRPAVRVIERDGRRSIECAVTGSA  
WVGEREARVALRAEVDPAHPAAGDPRGSRRLGPDILPHDPSRDPGPSASASWC  
40 APTTVASWGRTSDPRGPRGPPVRIEVRPRRDGRRRGSGAADLLVHRWYVTPASP  
DWTLEPATDLTWIATLDDRFGRWTPILELRILTADPILPVHPRLVPDGLIDVPLGVSSA  
S
- <SEQ ID No.:1341;PRT;Methanopyrus kandleri>  
45 MTVSLTRALGMPDVLHRPVFVPRLPPEYALVGLAAYLTALATRH YLGPLDYLA FSA  
LVPAEGFFVGCRSPSGGSV
- <SEQ ID No.:1342;PRT;Methanopyrus kandleri>  
LSPTATRPLETADLVPGTRARGPRHVAEVRAGAVVVS LPLPLAQIEWILALFGPRY  
50 DIFGALDTLLRVLRTLLAVPSNASVLSALLPTLPYLLPVPPWLERDVG FHLDPLLR  
QTVVPGQPPQSRPQEAGARVVPAPHDRGPQGIPGRRVRSTGTYP CRRFLRPV



- 5 <SEQ ID No.:1343;PRT;Methanopyrus kandleri>  
LVGSRIPSPDPVERIRALRVLREVYRRGKKPSLEVITYRTVNGSTCGPYYVARWRC  
DSRFKHGRTLYLGKPENESVSFVEWLVS LDRNEVLKLARHLMRNLSVLKTLTTEIS  
NLPYKRARRVLARGLALTFDARPSNSPRIRDVLEELPDRLESFLIRTLGGWPAHYSS  
HLNKIIRSRRKSLDGKHEIPDV LLELERWKLEY
- 10 <SEQ ID No.:1344;PRT;Methanopyrus kandleri>  
LDVRSLYGLALDVTTTAVLELVKRYPASGEKLPEDRNSVELVLWEVKDLFRRFELGR  
LVDEEEFLEACFEVLR LPGVPVRVGGACEEAGLET LRNVFTDPDASVLFITSRGLDV  
FEDVMDGLGMDPKDVRACRLLVRDDGAVGEDAIESWVEAGFEVRVITDGESHX  
XXXYT DNVMAITGANMTNVS LERLRECFVAPVVM DVKAPVALLEYEPLGFAAMV  
GANAHAVLREFLTPDRVYGGYLPECEGLRHLYREL RAGLEWYLREGCP EMLW  
WVEPEPRT PDL
- 15 <SEQ ID No.:1345;PRT;Methanopyrus kandleri>  
LSFHVTVDVTTECPHDCPHCNLRGTRRAGHLDPEVLERILAEVADRYDLDFVILTGG  
EPCLHPRFGELVELCRRYDAGVGVNVATEVHPALADV DHVYVALEPHRGYGLEGA  
LRTWEEVARLEPDEVYANTVACRD TYGELRRVNEVAVELGAAAHFVIAYVPPGPDD  
PLDDYPHDEL PGLVRGLRRACLAGMPYQEEVPFSSCRHGEYNLHV RADGELTPCQ  
20 HWKTYTLADLDEFEGMRGLEPEGPCRDCPRFE ECQGGCNAYAWN VAGRLMPDP  
RCPRVRGSP
- 25 <SEQ ID No.:1346;PRT;Methanopyrus kandleri>  
LLPYLV LGLVLALAPASGELLIRGSLSEDKAFLKEYLESEVL PKWKDDPRVIVDYS DW  
HHRLVYLPDRDLFVGTDGPATVTVGPGSVRVEVQLATVTEAGRESIQVSKSVRDP A  
VVANS GFDSVTVLVGDYVCGVEEKL VVGPPYYIAVLKEGDRVIDREDLGGLSVSD  
VEYEVYS DRVVMRVLGFGEGGKPLAIIVTFDLKDGRILVDREEITDAALIEKLSGELVE  
YPEGAVLRTGSGVEPLYVKFGAPRDDPLVR FIDKVRMYGQGASEEELRRVMSEH  
30 SNVEFLFPERGGGEESGLPVWVLP LLPVPLTVRRR
- 35 <SEQ ID No.:1347;PRT;Methanopyrus kandleri>  
VAKMVNSAWVRLK SHERKLEKARTVERVGRFRLNLATLGAVVGLALAGLSVLQPTL  
LGT LGTFLSILAQVVT LAVQLASLIPLT
- 40 <SEQ ID No.:1348;PRT;Methanopyrus kandleri>  
MREITDSPLAFIPALLGPVAGLYVTINGLSVEIRCRHPAGW MYNDAAVILPVTA FRDL  
LFPLVSVVIFKTAIERLRPLGPFGLFVAPVIAAAWEWAAERAFGAVLDRWYSRTTLA  
PLVEEPFKRLVAIELGVPGVSGLAYGLLEGLWKSRTLWGRKDVVSLRLRYIALNYVF  
VHALLTVLPLPIAMEVHYHLNASWFPEPEKVHLLVIQIFRDLLTGDIRTMLSMSYYTIL  
45 SLMLESTFGIPVMMKI
- 50 <SEQ ID No.:1349;PRT;Methanopyrus kandleri>  
VADYLEALSCLKSHDLDRCLVADDLPIHYLT LIPSADLLTDNRPQTFLERNELRVQT  
SFGEFHVGLRTPAVVSGCLENVLLRLGAPAPVTLLRDGTAAFVSPIGVIFARLDGRV  
VPEAEIRYEKYWSASNFFRAPSADYYEYRFDARRGVAEVRFYDLERRIAVTVSLN  
FNGKSATFSES AIDETTLRELRSRLKRVSEVQDAVLV RTPDGTEVWWVEFGVPGPP  
PGLTSRDGTEDPQHHA
- <SEQ ID No.:1350;PRT;Methanopyrus kandleri>  
VTRNSEVDWLHSSNGPTWPLSNWVKAVKYIVYVAPERKEDPTPLKVQVAESPN  
TLD CSTKDVPYWG EVTWGKV SERDFANAVQAMNGGTLESQ LFKAAVRIAYWVASK  
IPARDYSTPGDMDWTEFTPLQVLKEYWRGWNCAGHAVLAVALMRAAMIPAKVVG G

LLAGEGHAWVAFYNQDFRWVHVDPTGDAGNSYMLYLAPRVITDDDVEAHSGYY  
 CDDNATTIDDIEREWIPVAPIVVVAALMIY

<SEQ ID No.:1351;PRT;Methanopyrus kandleri>  
 5 VGWCENVMTAYRVRAQGPRVRAVVVGHQPYSLSVAKAAERLKGEIDVEMFYM  
 WDLRERPEEFEEAMRRADFAVLNVMSATAEAVDLDAIAEETPFVAVHSCFEVMR  
 ASFKSLGLEKSRLFRFFGRMMERRKDNLSGVRMDEALERGAKFAERMGWFGALK  
 KLKIAMRAFRYWDYGGADNVENMLLYLAGELAGADLREPDPPEEVPGRALYDPEE  
 10 GLIDVDFLRELREEYGTLPVTFYKFFYTNGNTEHVDAVIEALRERGVGAVGAYCSI  
 DAYGTLTRFFGDERPDAVVALTCFRIVGGPMGGEVERGIELLRWDVPYFVAPQV  
 WYLDREEWEENEFGMDPLSLLINVSLELDSAIFLPPVACQSEVGRFEDVPLHAME  
 PIRENVDRAAELVYRWLELRRRGPRRVAIVLFNYPPGEENVGEAAYLDTFSSLRNVL  
 ELLRDGLDLEVDLDRVTDDVLRRLGNPDLRHRRPEDVPAADEVPLDRYREWFEEL  
 PEGSRERVLEAWGEPEEDPLLVDGAFFIFGLDLGDVFGVGFQPTRGLHESEESYHED  
 15 TTPTHYYVCFYEWLRREWGAADVHLFGTHGTLEFLPGKEKALSEACFPDLLITPIPH  
 VYLYNVNPNSEAAIAKHRTYAYMVSHLHPPLADPELKGyreLLRLCEAVREGREDV  
 EELREIAKAAGIRVEVEDDDAYVGAVESMVRRALRDRIPCGLHVVGADPDPELVAET  
 AVSYAESRDLLDADREEAVEVVREYVEEGEDRLSEVFADPDVAVRELVDGLIESYDR  
 ETESLLRTLRGDYLEPSPGGEIERNPEVPTGRNLTALNPRRIPTPEAEERARKAVR  
 20 ELLERYREEHGEYPETVGLVLWAFETMQTGGETVAMIFELLGVRPVRDDAGNVIDV  
 EPVPAEELDRPRVDVVVTMCGIFRDTFPNVVELIDRAVRKVAELDEPEDVNPVRKH  
 VRELREEGHGRPESRVFGPRPDLYAADNMRSKVESDWDDESELIDAYLNDMGYV  
 YGEGVHGEEARGLFEAVAGRQDATAQVRSRHSYDIIDLHYEFLGGLTAAAEADAE  
 TYVIDSCSGRDPEVHDLETVVRSGAVSRLLNEKWKRHMLKHGYDGCREIAKRVEYL  
 25 VGLAATTSVEDWIWEGVAREYLFDEETRERMEELNPAAVREIASRLLAEHERGYW  
 DADEETIERIREIRKFE

<SEQ ID No.:1352;PRT;Methanopyrus kandleri>  
 30 MTASTLITESTFDALSGLEPPPEVGILVITAVIATVPTVVAIRIGGILGRVVAYFLTVALT  
 FSALPLILHIQRGLELGPRELLTALMMSTCSLSILRLATEGLKLTLSAVAVVNLagg  
 FALLVAVTGGWESLELALSSHWFRLMVVPAILTVLTYWVYVAVRDVLDWLRGRR  
 ADPRDLEAAEALLEGVRACERRLRVSE

<SEQ ID No.:1353;PRT;Methanopyrus kandleri>  
 35 LHLASRISTDRRARAKAEGLTAFGSALQTLVSVGIAAALGTRLGDGEVEVTNRAVESL  
 GIRPPFDEEKYLRGLTSVRDDPNRAYETMYRALWRWPRKVFRELHRTLEEDQAAF  
 AGIVDYLWEEIIRQARESPALDEFVREVKGWKVTREAAEATGLAGSIAGTVGDLLR  
 RSLSRHLHGSGEGDRDRSERRDEHRSWRLGDAISQYSGSSEGTSPLSKRTGDAPR  
 40 GRGEVARDPGFDGVDGAGRSGEVPRTRPREPEGTARGGRGTGRGRRGPWRWL  
 RR

<SEQ ID No.:1354;PRT;Methanopyrus kandleri>  
 45 LLEILALTVLTPEDPGRFLEHVLENPKVLLAAGGGRGGAAGGRGGGFGGRRGGGR  
 GGGAGAKLSPRAGEILES RGKFLRELRRPRS NLKCCPSRHSEERRRLLRLYGKVR  
 VYYSTVPPTLTIGGIVALLSTPFTVFLPLRRALNRVWERRYGPRFRGGDPLWYLRYL  
 DEVRFRFNERIAGRLWAISALLTVVAEGELSYQAAYAFADAVVEGGEPLSAFYDW  
 AVLGMEALLAVYVATSVVIALHLVTRDPKHRRYCPIFRACLPRPYRRRAWRTLRTL  
 TVPVSILPVITGAWALRWGLWVLS

50 <SEQ ID No.:1355;PRT;Methanopyrus kandleri>  
 LLEPLTLTLLALPGDPGDVLPVLEHPEVFPAMGRKGHDGERWTGRRKRVRQVDA  
 KLSRVGEILSGRSPGTRKGSELRKRYPERKRERLLSLYRRVRLYYRTVFDELVRLLV

ALLVTFFMVCLAVKAAGEDSVANLFRLAGISIIVDIVALIAFCEIVLTAVEDFADAVLAG  
ESPEAALDAFYGGAVLTGYSLIAAVALWIVRRTSRELDVRTLVQASILILPLVAGF  
RALVWGMWVTGRYADVVPQLLGFTSVLIVYLLVRLNLKLSKDRASP

5 <SEQ ID No.:1356;PRT;Methanopyrus kandleri>  
MEPLTLVLLVFPDGPGEHLGHALLEHPEILSAVGGGRGGVAGGRGGGGGRGGAGVK  
LSRAGKVLKSPKKFYRVLKRLKRRKHPERERRRLLLYWKVRIYDRIVPTALILSGF  
ISFFVVPVLDLSDRLLRKAWERKYGRRFRRTREWRHRCDYELSRLCDDVTYRLF  
10 LTSLLGFLVVGVEGIFSTWAVEAFADAVLRGEGFRAALDAFRWYGVLMGYLLAAY  
AALCVAIAASAVARTWERRRTERLREEVRRRLGRRPEKSDPPSCIPESFRTSVSRV  
TRALEALLILPLVTGTWALRWGLWVLS

<SEQ ID No.:1357;PRT;Methanopyrus kandleri>  
VIAGGPGSGRVVRAGGPGRGPRAGRRAPRGPPGQGRGGGGGRGGGGGRGGAGA  
15 KLSRAGKVLRS PGKFLRALKKFKVRKRYSKRERKRLLLLYWKVRLYYRTVAEGVLL  
YASFALAIVIFALDFLTDDLELLRETWFERSLYLTSGGAFLAIFGEMVVANRAVSASF  
EAVLRGGGLPAALGAFRAWAVYGMGMMLAMVALVPLIALTRKEPDVRTLPMLAV  
PLATGIWALWWGLWVVS

20 <SEQ ID No.:1358;PRT;Methanopyrus kandleri>  
VHHTASEMLAVGAALGVSGGLAPGPLQALIVAETLGNGLRAGLAVAVVPVITDGPLV  
TAAGLAAARLPGWVRLYLGLAGSAVLAYMGLSLIREADSAEPARSEGAGSSLRRAV  
VWLLNPHPYVFWLTVGSSMMGSARSLEPMVAFPVGFFLGIVSTQAGIAVAVHRAL  
SLTPAERVGGARRLSGVLLGAAAYLAYVSLRDMPS

25 <SEQ ID No.:1359;PRT;Methanopyrus kandleri>  
LRRREPTYQVSLDGLRESTSALVIPPTRSRVYALDRVLERPHSVLGERVGSYGQL  
EGRSSQSLTRIMETQNEIRQDPPSE

30 <SEQ ID No.:1360;PRT;Methanopyrus kandleri>  
MRLWESLVLAMLSVPEDPGEWLG PVLGHPEVLLAKVGRGGGRVGIKFPRIGRTSK  
SERLPRVKIKNWGYPEREREERERRERELLVYWKVWLYHRMVPYLMKAFVV  
LLLGGLGLVALYCLGVLKRTWRYALLTSVLA AVLGLVPEAVMTNYAVEDFSNAMLA  
GGGLQDCLHAFKWWGVYGLWTLAAYVMLVLA AVLARNALRDVPVPVLALSLAIL  
35 AVPLVTGIWALDWGLWVTMS

<SEQ ID No.:1361;PRT;Methanopyrus kandleri>  
VRLPVVLTSPVLGILLLSIHVARPVNPSSHYALDDFLKVEFDGMRDGIVLKFPVALD  
GEVYVGSSAPGRYPYPVYRYRDPLEGGIANVWIEGLPYIGRSGVHTFIFKVINTEGR  
40 PIFYGEVQVRRDPRTGRFQVLRG SVICGPFVYCPRPDGCVIRYRTLEPVRTLVVR  
RPDGGIVTRLEDGKPRTVHEFRVTGLRPDTEYELIVRWNGFELAKREFRTAVPDGA  
AGFTFAFASDSRCRHLKESAGGGDADAYGCNVEALRSIMMFAARHGARFLVFPD  
LIYGHATPEDARLQYWNWKQAVAPWEPSPVYVGYGNHEAAVVGSGGRCSGEEV  
FSREFVTPAELGRGPAGVSEGRGLPPYGD TVYWFYGCVAVVVLNNCYSGMLRD  
45 WTGPGECPYLGVM DRQLRWLEETLDRLD RPTVRYVFVA AHLPPYRLTEPQELS  
NRLRPVVNGRPVGEYVDRLNRLLEVL MRHRKVALLCGHDHCYARYLIDRN FPM  
YPKGWRGRDIRREPWFRPLWVIIDGNAGAPMFTLADSPWKDRVRVFTTRS AVVVL  
FHVRFDRIVVEAYDATTGERVDRFEIPAPG

50 <SEQ ID No.:1362;PRT;Methanopyrus kandleri>  
VATLLEAPRIVERWLRGMEERGEYEP AWGDREDVYSVALAGVLHQRTTRRELAEPV  
LRELLRRYPEPSDLLKAPEDELKESLARIGLVERRLKAVLGLARLLSEDPEPSGEDLL

SVPGVGPYTADLVRAVYRERVLPVDANVRRVRRSTGRPVGDVGAEWVRAARD  
PRDLALGTVELGRRCCRPEPECEECPIAGVCAEQGRVRG

<SEQ ID No.:1363;PRT;Methanopyrus kandleri>

5 LYTFVVELSIATVLFISSVYLLAKSVGFDRDRAIAASVLAASGMLPQWEWGGTYPMT  
LSFGFGLLALAMRDRRILAPILLTSLYSHPLGGXXXXXXXXXXMLLWGAFERRPGYAV  
SVGVAWALALPHYAFFLPYARWLSTLIDSPAPDELFRMLLLPFPDLVSPGAFLLALA  
GLGLWRARREPWARVTGVCWALAWGMVAAYALGLTRHLPFGRNLLDRFTCVLIT  
10 PLLALPAAYMLRDRARHVRIASKVLLVLSISSAALPLSDSLSCELPTVPGSADVVAWV  
KEHRSHDPVIRVEFLLATKRYGKPHNALWVGPRVKGFFAQGDPYFHALTERMWE  
GFWWYDPEFVRTVCRLCNIEYLVSFFPTVKSGMAAGLTPVYKSKWIRVLENRRIA  
GAEAVDPIGVYDPRSVREVKEYTTALNLVPKRGYRYIFAVVEDPRELSAFRKVLIR  
PESPEDVRLAVRLAREGKRVLLVLPAGDDRIAREVSRELGVHHPKPAELRLRPYRK  
PILPRSLRTTLILKGPKRSEKVPVPGYQVGGGWFRDVRVGRGTVRVVGVDLPVVAIR  
15 LHPTYVNVGKDLGKIPPLPGPHERRLYSRILDGFGSLHPIPCRFDPRSARVEVIPS  
GYQWALVKVHFPAWHASGGRILVGPGGTMIVRTHSERVILYFAYPTRLYALGAVG  
FALGALALARAPDAVLSVIPGQRPESD

<SEQ ID No.:1364;PRT;Methanopyrus kandleri>

20 LAERPEERQWKWEWEEAGLFEADPDDRESVYITVAYPYPSGSMHVGHARTYLVPDI  
YARFKRMQGYNVLFPMFHVHTGTPVVGIAERIKEGDEDTIRLYRDLYGVPEEELEKF  
TEPEAIVEYFAREYEENMKRMGYSIDWRRKFTTVDPEYRSFITWQYLRRLREKGLVD  
KGEHPVRYCPHCENPVGDHDLLEGEDATIEELTLVKFPVEGDDLILVAATFRPETLY  
GATNVVWVKPDEEYLVVEVDGERWVWSEEAYRNLRHQKDGVEKVDTVRGEELIGES  
25 VVNPVTGEALPVLPAEFIDPKFGTGTVVYVPAHAPADAALEDLKKDPSVLEEYGVD  
PSVVEELEPVQVIEVEGYGEFPAYDALEEHEGIESQTDPELEKATQEVYRAELHKGV  
MVVDEFEGTPVREAREEIKSRLESADVMYDFSEKPVICRCGTECVRLKDQWF  
LRYSDGEWKERAEEELLGRMEIVPEEVANFEDTIEWLDDWACARRVGLGTPLPWD  
PDWIVEPLSDSTVYMAYYTIAHRLKGKGELPPEVFDYVFLGEGDPEEIAEKAGLDVE  
30 ELEAMREEFEYWYPLNWRLSAKDLVTNHLTFFIFHHAALFPEDKWPKGIVFGMGL  
LEGQKMSSSKGNVLLSEALDEYGPDVVRLFLATSAEPWQDFDWRDEYVRGVQR  
HLERFETLIRDHADESVEDKDAVDRWFLHEFREVVEETTEALEGFQIRRAYNRAFY  
GVMKLLREYEAMKGHVILGEIAEDWLKLLHPVIPFATDRLWREVLGEDSFLLEEEW  
PDPSEYPEPELSVAKEVLDRLIEDVRDVEKVIGAEPGYTLHVYLAPEWQWRALILI  
35 LKDKFGEVMSSELMKDEGLREKGDVAKIVQELTKEDLPEDVDVDALREALTEFLE  
AAGRALTDKTGASEVVIHTDPEEAPGPEDRKAGARPLRPGIWLEE

<SEQ ID No.:1365;PRT;Methanopyrus kandleri>

40 LATVAVLGFGNQRLYERIGAAEKLGGEPFPGGAAMAIEFAEAGHDVVLADPNLSEQ  
DPEHVDRVADAGVELTEDDAQAVEGAEMVVLFTFPFGATGGIIREIASHLEEGAVVCP  
TCTSSAFEIHESLYEAGLEVPEAVGVMPAHPAGIPGTENHRAITARGTNGTTLAT  
EEQAELVEEVLSSTGKEVFELPHVELSVVGDLSVLLKRVIEALKEFCVVKALGAP  
QEMIDRQAMMTLATLAALIEAGGIGLLETLDDEEAIEASYSNMEPFVDGVEEPEGEP  
VERFVVLPGEATREAVIELVGERGWRTVRMRWVDLYKKH

45 <SEQ ID No.:1366;PRT;Methanopyrus kandleri>

VSLEEVLDEIRREVTPDPEERELVEGFARRILSEVRDRLKERDPAEVELIGSVARDT  
WLPASDVDFCVFPKDRDLDEIVEVTLEVGREAIALGGEAREEYAHHPYIGGEV  
EHRGRTFEVDVPCYDTEPGEVITPVDRTPHHNRYVEEHLEDTEARLLKAFVKAID  
50 AYGAERVVKGFSGYLCCELLAIHYGSFEEVLREAVRTWRPGFVIDLEGFVGEVYEDY  
DEVRETFEDQDPALIVLDPVDPERNVAAALSRRQLTRFILAARAFLGDPSPEFFRGR  
KPEPVSGEKVRDWFERNPTHVVAIEVRLPDEVEDIYWPQLEKTARSLSRVLENEGF

EVRRWVHVMRDSEEEHGYVLLEFEH GKLP ELEWRVGP SGWVREDRVRGFVRAHG  
 RFWVEEDGKLATRAERKFVRPEDLLGRLEGADRQTLLSHGFGKDLARSSEGEVRL  
 LSAEELAEADRDP ELGKALAEFMRGDPLSELVRDRL

5 <SEQ ID No.:1367;PRT;Methanopyrus kandleri>  
 VSRFRAFISIDIEDEEVNRIVEVQERLKASGADLKLVEPENVH LTKFLGDIPESRV T  
 DVVNAMEKAAETVEPFTMRLKGIGVFPNP NYVRVWIGVQEGSDETKAMAAVLEQ  
 ELGRMGFRERERKDFVPHVTVARVRSGRNKGR LIEAIRELSNVEVGEVEVDRI RLKK  
 SILRPQGPEYHTVEEVEI

10 <SEQ ID No.:1368;PRT;Methanopyrus kandleri>  
 LGYPVREPGMGKEVVDSLEAFNAYAREQWLG EVVREGTILFDTGVVHSYAFKVV  
 RVVPSGMGRITSSSTRFVLRTRFEEDRMEIPNL TLDDVVGHEEAKRACSL LVEYLKNP  
 EEFRDWAPKTVLFYGPTGTGKHTARAVAGEAKV PLLHMNAAEILGKYVGEASERI  
 15 RRAFRTRARKAAPCVFFLDEIDALALDRRYQELRGDVVESVNALLTNLDRLKNEGEG  
 VVFIAATNQPDILDPVRNRFEYEIEFTLPNK REREELVRYYAKKLPMPLDVDPYIA  
 ARTGGMSHREIKERV LKRALLEALREGAEKIERKHIQKVLNQERERRAVRIYHR

20 <SEQ ID No.:1369;PRT;Methanopyrus kandleri>  
 MSRKKSLVEMADLHGUACKLPQGDLEDLLKG VELPEEGGRVEVGVGD DAAVIRVD  
 GGYVIQSVDFFTPIHPDPYTQGR IAANNSINDVFAMGATEVLSVLVSGFPRELPEE  
 DAREMLQGFADQCREVDALIVGGHTIMNPWP ILGGCVTGFAERYVTVGGAEPGDV  
 LYLTKPLGTQPAMAALRLPEDVRKQFLT DSELEEAVDLAVEVMTEPLKDAAEALEV  
 25 GVHAMTDVTGFG LKGHAGEMA EASGVRV VIERLPVIPGTT ELSRALGYGLERGES A  
 ETAGLLVAVPEEHAEDLEDAFERRDVWYRRIGRVEEGSGVEVRGDVEEVEDYP

30 <SEQ ID No.:1370;PRT;Methanopyrus kandleri>  
 VLGKGRPLVVRGRTVEQVWRQAVTGIKVHGEK VERERGPVKEVRGLIAHLEPSGP  
 ESFDIPDDYPLDEHSVRAYEDQLLDP ELRGFEYTYGHR LRRYFGLDQVTKIVERLSE  
 SNNTRRAI AVTWDP RRDLDEEEVPCLTALQLQSDGSGLELHAFYRSWDVGKALV  
 ANMIALRRLQEHVAERAGLEPTTLTVYA ANAHVY EEDLPDLP

35 <SEQ ID No.:1371;PRT;Methanopyrus kandleri>  
 MKTGTWRVKTGFARMLKGGVMDVTNVEQAQIAEDAGAVAVMVLEKVPADIRAAG  
 GVARMC DPAKIEEIMDHVTIPVMAKCRIGHVAEAQVLEAIGVDMIDSEVLT PADEE  
 HHINKWEFEVFPVCGARNLGEALRRIAEGAAMIRTKGEAGTGNVAEAVRHMRIRRE  
 ISELTRLDKEELYGKAKEYGVPFDLVAEVASLGR LPVNF AAGGIATPADAALMMQL  
 GADGIFVGS GIFKSDRPQEMAE AIVEATAYYDDPEVVAEVSKNLGDEVAMRGLEISE  
 40 IPEEERMQLRGE

40 <SEQ ID No.:1372;PRT;Methanopyrus kandleri>  
 MISEDSGSNEDREV KIAVIGPEDAGKTTVVRQLSDKFTTVSPRGKTVGIDFGKCKYY  
 EGVYMF GVP GHLRFK FVMRLGARNADGMILVIDSADPRIDKAVKIYNIVKSVVKNPH  
 RVVVFANKQDLPDAL SPEQVGELVKRALGISPPVIGTVAIKGEGLREG LD TLLFQPTY  
 45 NGTNEIDDIEIKGIR

50 <SEQ ID No.:1373;PRT;Methanopyrus kandleri>  
 LPVPVKNRATLAQLMLSYGITICVDEDVLRAINEMTFGQLPMILDES VNVPLEYEENII  
 DAELVS LLEFGEDMVSSLLDMIVVRVNAVNGTGTWP WELLNTILLADNPGKVELNGS  
 YFSIFAIDERQIVYISSSGRRRIPYTDLT YMKDISEWVNARNIMSPNYAYIYDESALNIT  
 EDVLKKRYRASIKGLSELLDRPKHWVRIDTTITEKDGILIRDRLLDWIEPLEFTKITVR

RDVDEPAIEAITGESKVNKVYALRVFREIKPGFKTYRELV ERAQLPDSIVKSTLALFTR  
FNFLMYSFKYTPPII

5 <SEQ ID No.:1374;PRT;Methanopyrus kandleri>  
VPVYKSAGVEYKPSLYVIPMCFQGD LIAGELAVATLLFVIIVGSLSLISLRNAIHARDK  
GRVVLHIGMLTFLASFTYAAFRMVQSSLFVPVGPPSPRTVAVPPAIVSGNEINMV FV  
ASLIGLGLVVGAIASMT RRIRV

10 <SEQ ID No.:1375;PRT;Methanopyrus kandleri>  
MSVTKVYFVGAGPGDPELMTLKGVRVLRADLV IYPGSLIPRESVEEWAPNAELIDS  
HGKTLEELVETMVEAVEDSRTVRLVSGDPFVYSSLYEQVRELRRRGVDYEVIPGV  
SSVNAAAAALGEELTKPGISQTVILTRPAGRTGKPEGESLSELAEHGCTMVIFLGAA  
YLERIVKSLGGAYDEDTAAVVYKASTPEEKVILGTLGDIAEKAREEGIDRTALIIVG  
DVLKEEGKRSHLYSEYARRVRR

15 <SEQ ID No.:1376;PRT;Methanopyrus kandleri>  
MIVGKLYVGTGPGDPLMTVKAQRVLRHVDVVVGYRTYVDLIEEILPEDVEIKRYG  
MREELDRAREAVRLAADGFEVALVSGGDPGVYGMAGVVLPIAVEEGVEVEVPGV  
TAACAASALLGAPLMLDFAAVSLSDHLVPLEEILERVRAALEADFLVVYNPNSSER  
20 RHIFEAFVDVLEEIVEEDRPVGIVRNAYRERQSVEVVRVRELRLADRIDMRSILIVG  
SSRTRMVGDWLVTERGYSSRTGRNSSE

25 <SEQ ID No.:1377;PRT;Methanopyrus kandleri>  
VGGVPRFWRSIDNRYRLVGTRCKNCGEVFFPPRVVCPNCRSDGEMEEVQLSGRG  
EVYTYSVVRVPPEGFEDKAPYVVAIVKLEEGPLVTAMIVDCEPGEIDVGTPVEAVFR  
RISEGEDGVIYYSLEFRPVREE

30 <SEQ ID No.:1378;PRT;Methanopyrus kandleri>  
MVCVRFRRDVAIVGVGMTRFGELWERSFDDLVEAGLEALEDAGMGGDEIEAMYV  
GNMSAGRFDQEHVASLIADRSGLTPIPCTRVEAACASGGLAVRQAILAVASGMYDI  
VLAGGVEKMTDVTTEEATATLATAADQEW EAFHGVTFPALYAMIARRHMYEYGTTR  
EHLALPPVKNHRNATKNPKAQFQFEITVEQVIESPLVADPLRLLD CSPVSDGAAVIV  
CPLMAKEFTDTPIVVRATAQASDSIALHDREDITTLKATVEAAKT VYKQAGVEPEEV  
DVAEVHDCFSIAELVAVEDLGFVEKGEAGEAYHEGMFEIDSDYVAVNP SGGLKAKG  
35 HPVGASGVAQVVEIVEQLRGEAGKRQVDGAEIGLTHNVGGSGGT VVWHIFERAD

40 <SEQ ID No.:1379;PRT;Methanopyrus kandleri>  
LIPSERVGIVGYGAYVPRYRIKAEIEIAAVWGDDVDSIKSGLMIEEKSVPSETEDSATIA  
VEAAKNAVARAEIDPKDIGAIYVGSESPPYAVKPTATIVAAAIGATPDLTAADYEFACK  
AGTAAIQT CAGLVASGMIKYGLAIGADTAQGAPGDPLEYTAAAGGA AFVIGRKKLVA  
EMEGTYSYTTDTPDFWRREGQPYPRHGGRTGAPAYFKHIIRAARGLM EELDLS  
EDFDYAVFHQPNGKFPRKVARSLGFEPEQVEPTIVVDRVGNTYSGSSLLGFTAALD  
RAEPGDRILVVSYGSGAGSDAFS FVVTERIEEVREKAPLLEEYLED RVVYTYGEYAK  
45 MKKKLKF

50 <SEQ ID No.:1380;PRT;Methanopyrus kandleri>  
LNHPRGVISLPRSLVLKRIVGDIAASEHPGKVMRKWRKV FHASQVEVARRMGVSPS  
VISEYETGKTKAPRVDTVRK FVEALIEIDEERG GNIVSALENVLFSEELLVT LIGIGEF  
YPRKLEEVYEAEAPVVHGNVDVFGYTVIDSVK TILEVPARSLIRVYGECPNRVLV  
FTRIDRGRSPMVAIKAAGVKPSAVVLHGIDKSEVDDIGIKIAEVEGINLATTTESISRIS  
KRLKELTEVQPGDRG

WO 03/076575

- 5 <SEQ ID No.:1381;PRT;Methanopyrus kandleri>  
 VLDGGLTLLVLTALALFRERKKRPQKVSVIPAYNEEKTVARVVRAAKECDLVNEVIV  
 VDDGSEDRTAEAEAGAIVISHSVNRGKGEAMKTGLKHASGEIVAFVDADIKNIRP  
 EMIEKMIRPVLEGEADLVKTKFKRKAGRVTLLTAKPLLRRFFPEVAHLEQPLSGQICA  
 10 RRKLLERVDPEPDYGVDIGIILDAVALGARIEEVDIGEIKHEMQPLERLHRMALQVVR  
 TILDRAHKYGRVVLRWNVGKALNRMNLGVSLALALATLFYTELPLASVLALGILGLG  
 IALFSLAQLVYELLRVEGKKRRILRPFLHMHASVIMSLAVVAVLVGAMFSSIQIAHDRV  
 EVNPLPRKVWVGEREVKAEGPYVVQYGRELKMGRNVLVLDLKPDDVLVYQRGE  
 YRVESAGRDNLLMVPTELARQLGIKPGNATDSEIRLAFRNITVKKRVEGPDVNIRVT  
 15 AVLSATPDRAEALTYYVDGKKEAWIPVATRGGSVYVYVSGYGLIKLEDRSVVYVGN  
 REILLKLEDTDIETLLLAPAEPTPFVIELKMPSVRVAVE
- 20 <SEQ ID No.:1382;PRT;Methanopyrus kandleri>  
 MRELLAVEPSPGADLRVCLTYPNEYRGMASNLGFHIVHRILAGIPGVSVERSYVPTD  
 AYKSLDPNRTLVSLETGSPLESEFVDFYVGEAEAGLEEGIEAILTARDRRDALEELADL  
 NDPLVLVGGPCTVNPKEPYVDVYVGEAEAGLEEGIEAILTARDRRDALEELADL  
 PGFYVPEYPGTVDRVTNNLGGTEPPKIAFAPEDTEHTGLRAYPVELGRGCPYRCA  
 FCLGGFTAGHMRHRPVEQLLEVEDVEKSPYDRAAMISPSPTLHPEFEEIEECLER  
 HLEVSLPSTRINDLDPELLPELREAGVRTLTAPESGSEDVLEFLNKPPLHRDHLELV  
 25 EDAGRLGMRVKLYFIVGIPGFPEEDTVASARLARECAELADVRVSNPLIPKACTP  
 LQYSEMLSAREINRRYRLFEREFRGRVSFEDPELARAQCLLSRGDVDVSRILEEVL  
 WNARSPGAWARAMRSHGVSISPDRPPDGPEDVPYDFVRAGPDHEELYRLFTSLQ  
 CAPMK
- 30 <SEQ ID No.:1383;PRT;Methanopyrus kandleri>  
 VSPLNRKELLRRVLKEALATGRYMALGSMDGVLASMGAVLSVARGGSAQDAASA  
 GLSVAVALALSNGFGSYLGEKIEELREIRELERQMIMKRGGLEHTRVHDLARIRIYTS  
 VVSHGGSSFMASMPILPVLIIKDPKWSVIACTCVSGIFLFLGVYLGRLCKERKKDLI  
 LRGCEAAIGGLVGLVTHFMGAH
- 35 <SEQ ID No.:1384;PRT;Methanopyrus kandleri>  
 MAKIRRLVLDVMKPMEDTTTELARSLAKLEGVDGVNIVLVEVDRDVENVKVTVVEGP  
 DLDFERIKDLIEDMGGAIHSIDEVVAGSRIVEEVKTPQDD
- 40 <SEQ ID No.:1385;PRT;Methanopyrus kandleri>  
 LSTWHPRPGPIPAAMYTLRDLLADAVVLHGPKGCCFRTARLLEKDGVRVFVTGMEE  
 DDFVFGALEKLVELLEYVEERLEPELIGVVGTCVSSIIGEDLEAAVEEADVDATVTV  
 EVHNGMGPNTGVRTLERAAGVPEGEVERQKRLMRAAAELERRRGMASREY  
 LEPWSGHDPSEVARVLLSSEDVLAILNAKKETAYLFADPVLEVKGKRGAWVLNLSP  
 45 ESGLPKVRRDAEVIGSIFREEGIEFEVTGSLDEYAVTGELLAKEIEFDPDSVLITGIP  
 HAVAPEELDVDATFVAVTDGLREASALRELGYDVVVEEEAHARVLGRREIVPSDL  
 GEAIRQLSA
- 50 <SEQ ID No.:1386;PRT;Methanopyrus kandleri>  
 MLPSSPSCRCWLRAPRRPHRVVLPALVSANSVGALTPLGNPQNAIYSHYRVDVVD  
 FFVTQLPVCAALLAPGLLYAWVRGERVESGSGSAPNVLDVAVVIAAAGCLLAHVPV  
 YFWFPAVFGYYAVLRPHAVREVDWVVIGLLTVGVLVPSVIGSLGWNPRVDDPFVW  
 SVLLSQVSNVPTTVLVPMDDWRDLLHGVTVGGYGTPVASVANLIALRAAGSRG  
 VLRDYAVLQGSCLMLGVLSHYALS
- <SEQ ID No.:1387;PRT;Methanopyrus kandleri>



5 LERSLLIKTILGAVAGAIALYLTFLHLADVDEVLRALQRADVAWILAAGACEVLWFAAC  
VEGWKKTFEPLGGRPSRRQLFLMYCVKLMVNNLISLARVLGDAIRVYYGIRLGWSA  
ATVIPTIVADIVLGNAGYLAVILLGCAIWWCCTEVSPYLIAANGVGAVAVAGLWALFAS  
ERTCHEAYESVRDLVEALVRRVGYSVGTVDDELVDSTVQLFRSKEARLALLQYTVGW  
AARVLRLYCVTWAWWPTASPLIPLVMSVAIRGSVVSVSPGGLGIVEGLTTGVLTVL  
EADPSRVMAALLLDRLYSFVIPVALGAVSVPVLERYVGRG

10 <SEQ ID No.:1388;PRT;Methanopyrus kandleri>  
VELYHEVIMLKDIAALADVHVGVIEILRRRGIRAVDRTEDRVEKLRRRCLEALDPSILVI  
VGDLKHNVPFASRIEFRGVPKLVDAALEIVDEVIVVKGNHDGLVEELLRNQGRVVRV  
GTRGILIDGFYFLHGHAEPDPELLSRSDLLVFGHEHPISDAVPGVSVKVLVELELDFE  
ELTRGEVSGRGPGFVLPADFDDLVGGTEVTSDDRLLLAHRRGAVIDESYLPIPEAEFP

15 <SEQ ID No.:1389;PRT;Methanopyrus kandleri>  
LAKVRVGVLGATGIVGQRFISLLADHPWFELEAVTASPRSAGKTYAEAAKWYLEEP  
MPEDVAELTVLETDPKEVEREADVDLVFSALPSDVARDEPAFAEAGFAVASNASA  
YRMEEDVPLVVPEVNPDLGLIDVQRDERDWDGFIVTNPNCSTIQMVLTLKPLMDE  
YGIESVVSTMQAVSGAGYAGVPSMAIIDNVIPYIEGEEKMETETLKILGELDGDRV  
EFADVKSASCHRPVLDGHTAIFVATEKEADPEEAAEVLGFRGVPQEKGLPSA  
20 PERPVVREEEDRPQPRFRDQDVGGMVVVGRIRKDPVFGGLKYVCVGHNAVVRG  
AAGASVLNAELLVEEGYL

25 <SEQ ID No.:1390;PRT;Methanopyrus kandleri>  
LQISVIGSGRASEDLNLAEELGREIARRGHVLVCGGRGGVMEAAACRGAREEGGIT  
VGILPGERRDEANPYVDVVIPTGLGEARNALVVRAGDAVAVAGGWGTLSEISLAKK  
MGKPVVGLTSSGGWAEELARRGEIEGAESPREEAVEKAELLAGYR

30 <SEQ ID No.:1391;PRT;Methanopyrus kandleri>  
LDEILERVRRERVEEIRDRTFTPRAGGRSLRKALSGPGVSVIAEVKPTSPSQGRLRDV  
DAEDVAERARAYERGGAAGISVLTEPEFFDGRPEYVEVVREAVDV.PVLRKDFIIDPV  
QVEESAHYGADAVLIIAAVGREAPELIDLAHEHGMEVLLIDRWEHLELLSECDPD  
VVGVNRLRLTLEVDLNRTELGPEVKDLTNAPLVAESGVSGPEDVLLGEVADAV  
LVGTYLMRAPDPSEAVRKLVEAGRSTE

35 <SEQ ID No.:1392;PRT;Methanopyrus kandleri>  
VIEPYKLAWSVVFGISRGLYVFAGSFIAAALRYVAEERITMTTAMFVGLITAGFASG  
PQKLAALAI SQPNVEVLSWTIAALFAIPARTYGDALGKRLL EARLSSMKPTTKVYRLP  
EDPDNIEDVPGEPPAPREVKKRIAGREYEFPRGTPREDVERVIKRDLEEEGGVGRA  
VVRVDGDEVKVRLAGAKPPVSHTLPPDKVAVSVKPKGGS AHIGEGDKVIVYADGQK  
40 LCEAEVWKRSKSGVVLVDREHADELMRLVTKGKDVSLVVEPTTE

45 <SEQ ID No.:1393;PRT;Methanopyrus kandleri>  
MSANDHPIRRPVAVYGVHGDEGRALEPVVRRVLPEGFRVSRVFENGYPVSTVDPS  
FHRSEVGARWRRVVEDLRPFDTYVELHCYRPRAYRKLTAERRSGGVPLVDFGA  
GVLLGSVPRQHKRILGDVLTLTLEVPRRPSDRALRVVSEILGLIPGRTRGEFVKELRR  
RFPEATEEALRRFRSYYPDRDPF

50 <SEQ ID No.:1394;PRT;Methanopyrus kandleri>  
LRSWFPHAPT VSVPEIEPEEALS YRDEIRTRVRSYAFGLDDWR AKVKTRRAYLRKV  
RDEDESEILRVYGALLTVAAAGPRPVRHLIAEGESAMAETALYALRHEDESAMSYPE  
ERVLS DLYLWDVRVLERDLGLYAVHFSFPLIHRSP EGQKLKVLVWERASLEKVLKEV  
RSNRVLGVRVLDPSGWNDVWICPRCGATRRGGTGDLEQDHARRCSNCRGRMRK

PDPNLLLEMLKEPEGYLIMHFCTLARTFREDVRRLVVS DIESRDDVEDEELREFCLKL  
 FPKVRKRLERVEKGAGGRFPFCIRELLRAQEGENLPHEARFALAAFLNVGWDV  
 DRVVEVFSNLPDFDEERTQYQVRHIAGEVGGGTRYLPNCDKMKAWGLCPGKDC  
 GVKNPLAYYYRRPRADDG

5

<SEQ ID No.:1395;PRT;Methanopyrus kandleri>  
 VSLRCPRCGGPVRPSLDRLECEEECEWSKELRSRPRKDTRLKWMKEYARRFLREEF  
 DDCGVSEVIVRGPRGKGAGYLAATVYVDDHHAIGKDGSRVKEVEEKLETALDELG  
 VPPVRITVHPSSALGRR

10

<SEQ ID No.:1396;PRT;Methanopyrus kandleri>  
 VIRYIVTVLVVASLLAAPVAAQEGGTTTGTGQATPAVQPSQPAPGGTTTATGGGGH  
 AGVSQPPVSTAGKAQKVESGKKAGEAKKKKEKRRKKPEKKRTRKAGLQGLTRSL  
 RELRYALATAVGLAIMAVMMGYGLVKFERRLSQRSMKAKARKAKKTRKPPKVER  
 KLRKTEPKKEEVERVRKLWKQVKEGD

15

<SEQ ID No.:1397;PRT;Methanopyrus kandleri>  
 LRTVRRALRRGEPVFIFDSEDREGETDMVFWAPEVTPDHVAELRRTAGGLICVVIHP  
 EHAREIRLPFLVDVYERADHPLLRTWPDDIPYDERSTFSITVNHRTFTGTVDedr  
 ALTVRKLAEFFTRNHEDPVREFGEEFRSPGHVHLLRPFDGLLEERRGHTELTATLLE  
 LVGLEPKVAVICEMLEPGGALPREEAERVARERGAFLTGEDILKAWKGGER

20

<SEQ ID No.:1398;PRT;Methanopyrus kandleri>  
 VFTGPVAVGEYVEGLGEGRRYVSIPYYRREIERVIGARPFPGTFNVRVEREERESL  
 RELASSYGYRIEPHGEYGGAWLYPCLVNGRPAWLVPDLTEHRDQVELISETELRR  
 ELNVIHGDMMVKIEVWGPSTWKLARRLTGPGSGGR

25

<SEQ ID No.:1399;PRT;Methanopyrus kandleri>  
 LEQLGRALLETQKDDPEPFLRALEETEVDPEDAERFLEALRIQREKGRISDETLA  
 VEDALFKVSESEEREIPEPDPLAEYAGVDRLGTIMTGKEADVLLAERDGEKVALKVY  
 RAHTGYEERHEERVYRLEDGEVRRIERGDAALREFSRLRRAYEAGVRVPKPYDAR  
 PGLIVMEYIPGEPLYRAPDLDDPGSVLEDLLDQVRLAVDAELVHGDLsafnVLVGD  
 DGVPYIIDLSEAVKVKEPGAFETLRRDVKNLVSFFERKYGVSADVDEVERVRRGV  
 YGTDGRGR

35

<SEQ ID No.:1400;PRT;Methanopyrus kandleri>  
 VRLHVATEDEIRRGETADVYFRRIRKVL EEGLADTEVVAEISTRSLPEGWEWGVLC  
 GVEEALALLEGRDVTYAMDEGEVFRPGQPMRIEGPYVEFCELETALIGCLAKAT  
 GIATKAARCKVAAGGKPVYSFGIRRHQHPAIPMDRAAYVGGCDGVSGIKGAELIGE  
 RPVGTMPHAFVLVFGDQRKAWRAFDEHVPEDVPRIALVDTMYDEVEEALMAAEEL  
 RERLDGVRDTPSSRRGDMAEIVREVRWELDLRGYEHVKIMVSGGLDEGEIRRLAE  
 VGADAFGVGTASDAPAVDFAMDLEIEGEPRSKRGKLSGAKQVWRCPNCLDDVV  
 LPRGKEPSPCECGSEREPLLRKFVEEGEVVREP KSPKEARRHVLETVGELEGLDL  
 TE

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<SEQ ID No.:1401;PRT;Methanopyrus kandleri>  
 MSRKALMPCTGMSPNGFVSRVVAELSEEEGIPSICPPATAAGKEKFLELLKRVEVL  
 AVAGCDYNCPARILREKAGKEPSETVFVSDVSEETGVDADSLYELTEANRELKVEV  
 KRRVKELL

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<SEQ ID No.:1402;PRT;Methanopyrus kandleri>

VRVAFYLLPLYIKSDDAWELGRLLRALDTRNRRVLVLDRARSFVHNLHQALRDAERI  
RSVEDLQQFAGQGGGIGVAEIIKGLVGADVHGLEAMVVCRTYLSNYAAQRSIIVPIM  
LHKIRLEPKDVFDNDPLDALRLEALESVLYDLAIVAGRAVRSEGDEYPFTVLLGAGTV  
VRVAQNYPDHAMEIYENFVETFKDELDPVVRVYDLGSKSEVPLEELEDVEVKKFEE  
5 LSEDERKELVNWMMNGQIAVR

<SEQ ID No.:1403;PRT;Methanopyrus kandleri>  
LSCGEDKEVLFEALDAVEEKYDLRKSQYEMLEEIRDQLAECDSVAVLTTRPGSGKT  
WLLRRIAREYRERVFYSPSPDLAEREYKKFKEWELSVDLWRRVEDYDEPCQVKL  
10 PELLGELEQEELFEVMAHAGSAQDEPKCYPWFYRKEGPLLKPLEDEELREKVRRL  
YRENPFIKGFAPWDSCGNCEIIRQLREPARIVCLSFKKLLSAPFLYASHRCAREALGK  
EPFVSEEDWEEALEGSLVLDLDAHVLPALIVEIRGYVRVGSRTLMDLKDLDLQDS  
HMWSVVDWNRDVRKVKKALEEKTKFREYVDRLTYELEDWIEELRELVRECRADY  
LDAKKNLSELLNELIERSEEAGIREWVVVKSPPRRGRPILTFAPVVKNLQELLKLLMGPE  
15 YFELPVAYLVAENRPTLSELDRRGVGV

<SEQ ID No.:1404;PRT;Methanopyrus kandleri>  
VERLEGGGVSVNVVCGHFNHGKTTLVKALTGEWLDRLPHEREMGVTIEPARAF  
LELGDTTVSFVDVPGHRDYIRNMLASAW SADYAILVVADEGPCPGTIDHALVVSFY  
20 GARVLPVWSKVDLVS RDRAAEVADEVMDLLELLGVEAVVEPVVSAKTGEGAEELL  
DALAELEPPRPSEMDPLRAPVESTRRVDETTVDVFGIVDRGTLEEGRVEVQPGGR  
SAEVLEVESTDGS GPGVPFRARLRVKGSITRGMCLGEGSTADRIEAEVLSIGAKVR  
PGTMGKVHVL SAAANVRFAEVETDAGTEVLRPYAEGHNVAHVLELDREVVEPG  
DRFLVTVGNEPAVLGVVEGVAR

25 <SEQ ID No.:1405;PRT;Methanopyrus kandleri>  
VPRPLLVL SLLLPALTSFAPVSCGEIVVISRYAGQFIEPLSKSGVDFVIDRSYDSLIV  
GANLEEVRKETCERIRNASAVLYRSSGLTSLDPYSAPEYAALAEALSRGVPFYVYQ  
NGINIPTGSTKAEMVPLADRV MNVGGAEVPLYLFTTLSENLVQFFRYVGGGEP  
30 RAFYLDGLLSLYDPLTDTVVS YDRPVDPIVILRYQREFPHGEVLSSYHGITYPRWF  
VELIRGEVLPRLREIFDRYRRLGESRGFYTPGAPT FIVFDSSNLLGRYLG YLDWLR  
VLAEKLHERGYNVPIALHYDALYMLPEDFLGALEPLVKEEHTVCIMWAVNHSM MR  
YYGPD SRLVRLFERLNVPIGLDSNHMG MTRLQWECLYM SERAADHYMFNVIAP  
ENLGFLGLFLVGT SRVRLPPGLARHVP GGVLVVRGKPIEETIDAVVRLVEKLRR LR  
35 EAPNREKRVALVYGVDTSGRDFVAVADQLDVPASVLHLLAWLREDGYSVHTPWDE  
VLRRVIELDREAWELLERGNFRQAIEIFREALNVLELSDRFWREYLF RAYHVGPYV  
RTPPLKTGLNRFVERAGGRAHEVELLLLDKVTLD EYLEWYRSLPEPTRLYVERGILG  
YLRYLVERANPEELPPDKRYLEFLRVRMEALMDTVISCLHLMNLDDATREALVRKLR  
EVFARVTDLLVRVSRGERVDKEPVLRELDGLWEEWRGR LDELGGFLFGWGPPEES  
40 PFLRTVDGTRAFPIPGMKFGNVIVLPEPPLL RMKSETELRASVLPPTHLYLAFWYYLT  
RKFDADAVVRVGGGRGRLEWTPMKPILPLGWEFP IVLANGTPIVCLYHVGDPTGCVT  
ARRRLGAIVLGHFPAPRNEVQFDPEVERLIEALEKYLQSRSPALRDAILELVRETGVY  
LVVTDEWEKFERNFDRCAELLYEYLREVEEEESGMCGLHVYGLPSIDPEDPFKSLEC  
MVEFALRRALWEEVDVDWEAVWTGRQGDRI SRLAREVLERFLLSARYE IENLLRAL  
45 RAEYVRPGFGGSPLRYVYVAPTGRNTCAYDVRRFPDEVAVSVSSVIATELYRHAED  
RVMTVMGPTDLATGGLQYALALELLGYVPVKTSFRSYVPTTTGRASYGTNLTGEVI  
GVLPWELPLVHVRHPNVVPVQTLLIRGRITEVRYLGNRPTVVVDDGTAHVEVVLPEG  
TRVSVGQELVVLGIPDFAENVRLLCSDLVISYSEEDVVDVADLVAMPTVCGGTSAC  
VSGIVARILDDHTVVL RSEYDPSASITVAFRYPVNLRVGERVVVVGELTFDLRTVRIV  
50 GVEVLDLPRVRKDVLLLVSGATFQGISPSALS LINVCRMLDVVAAEPWIALALGERS  
YLSPTARPHGTGRWDALRDVLEALKRSLKEAEERLRDQGCVPGLRRLDDALTRL  
ERDPLGTLRELHEGLKELNDYVVVGLRDLVGWNLAELLWSVAVGTGLWIPPSRNAP

- FLHWAVTYLVLREALLEERLPDWLLGGLTRENVAVMAGVAVFTQCPGEFIAPVLPmie  
AGMYTGDSVESLGLRALVGFSYTVLPYVRSELVGTRQPFHCPALALAVVTSdav  
LQVFDSDYDDSNLFCGCTVDLEASARALLDYLLRENSIRGWTLDVSKVDLGafkp  
GWNNAKSAGRLARLVGWKETLLRAASGLKETLREIERGSGPLVSTRAYLVRSllrt  
5 LYNRSFIAGLRRFGVSGALYLLRSLKRFATLGYYAIGRRDLAAVLPVWWSAVGANAD  
WLASVPTALASAAFLARISTDLGVPPYPREVLWITSVACCCPELCAFQTQVVERMA  
TEAIETATAVPPTVPTARPTFGPTVRVAPRVPVARITVTVSHVAAVTGAVVGPRSA  
KPTGVSLIGVAGKVTTGGAEKDAGSTAARTGRVLAQEYRAAPVSYPFRWLLVLallt  
GCFLAVWWARRYEPGPRGW
- 10 <SEQ ID No.:1406;PRT;Methanopyrus kandleri>  
MGILRPLVLALVTVALSTAPGSAITAEQIQECARAAHDWLKSQQYTEEDVGKvieyk  
DRSGQKATYEVKPEDVGAFPMsyKSDVYYCLPNLHTYVVMdTLTAVEVGYPVD  
KDMVLKALQYMWNVKGKYQRKEDPNGEWAYWARIKDGKEIPSAGLTAKFALPFFR  
15 ARQAGIVPDDKWNEYKPFLEKVINWLREGPNLQKEDKGYCWIDYPDRPGGAHGIT  
DVTSYCLRMLLAAGTSPDDELILKVVEWFLNNQDEKGNFYTDPRDTGCPYPLYTTG  
HCRAMIALCDWLEAVQRAGKEDELKDLVERVKNALKKAIDYLLSLRDPETGMWGR  
GSLSEYPPDYGSTASALVALLRCAKLGLIDPNHEAIVKALEVLHGQYLEAKRLRlPFY  
WYFIRSVWSPELRYRSQTLATSYALAAFALEKLGVGKGWVKRKRIFVTPAVVALA  
20 LAASLLTRRR
- <SEQ ID No.:1407;PRT;Methanopyrus kandleri>  
LSGGRRLDPLGAFVGLLTEISPYLLIGLVGAALQSMVPERYLARHLRGGLKACIIATL  
LGVPLPLCSCSVLPLAIAAKNRGAGVGPVIAFIVATPQTDVNSLLLAYALLGPYFTAA  
25 KVLTAVVAIVGYLAELTLKDRSEETEELPSCGEHGPCYGRSFKDFPRELLELSG  
TVGPWLLIGLAASVLELWVPSPAVRYLEGFLGPVLAALISLPLYVCSVAIPIAAALV  
AKGASVGSMLTFTVAGPGTNVATLSVILRFLGGRIVAAYLVGITLCAVAAGYAADTIG  
VPVVSTGIFEASCHPSLGAVSAAILLLLMTAGIWRRLVRDRT
- 30 <SEQ ID No.:1408;PRT;Methanopyrus kandleri>  
MRPKQVWVSVAFEGEWNEKKPYVTESIEAGVDVIVCLPEDVERVKELGNVKVAVPL  
MPESPGSPDLALEELDAIDADVVIVKGGEEDGSIDLDDISESIDAALIEKARDRGF  
EVAEYVEILDKPYERFAAEIAKNVGPDYVIAIGRDWKIIPLENLIAELQGEKTQLIAGAR  
DAEEARIAFETLEVGS DGVLLDAERIDPSEIKKTAEIAERAAAERFELVAVEVKEVKPI  
35 GKGDRCVDTCSLMSEGEMLVGSTSRGMFLIHSELENPYVEPRPFRVNAGPVH  
AYIRVPGGKTKYLAELRPGDEVLDTEGRTRAADVGRLLKIERRPLMLIRAEYEGVEI  
QTIVQNAETIHLVREDGEPVSVVDLKPDKVLAYVETEEGKGRHFGMEVEETIVEK
- <SEQ ID No.:1409;PRT;Methanopyrus kandleri>  
40 LVHIGKQIRMERIMNRETGRTLIVPMDHGVTLGPITGLEEDLEETVDAVARGGANAVLL  
HKGMVRAGHRGYGRDVGIIHLSASTELGDPNNKVLVSRVEEAIRLGADAVSVHV  
NVGAEDEPQMLKKLGEIAARCSDWGMPLVAMMYPRGPKVEDEFDVEYVKHAARV  
GAELGADIVKNTYTGDPDSFREVVKGCPVPVVIAGGPKAETPKEVLEM/VKGAIEAG  
AAGAAIGRNIFAHKSPRMREAMTRAIRIIHEDAEEVEEAMKELERV  
45
- <SEQ ID No.:1410;PRT;Methanopyrus kandleri>  
VLRSLREALETLRRHVQVLEVVAEHQPIGIGRISDVTGMEWHKVRYSLRVLEEGGIIR  
PSKKGAVLTEDAPARISKISRRLSELNREFEDISKRYQSLARKLEEG
- 50 <SEQ ID No.:1411;PRT;Methanopyrus kandleri>  
MLFLSEDHVRALLDVREVVREVEETFRIKPECEMPPKTIVPLEGGDFRVMPAYLSEL  
GVAGVKIVNSHPDNPDRGLPTVMAVMCLIEPETGRPLCLVSATEITSLRTGAAGAVA

SKYLAEDVRTVGIVGAGVQGRYQLLTHAEVFDLEAVFVYDQAREAARRLAEWVER  
DLGVDALVDNLDFSGLDVDVCTCTPATEPYLGSEDVPEDVHVNAIGADAPEKQE  
VKTELLKRAVVVDDREQCVESGDVSQPVERGELNPEELIELSDVVRGETEVDSSSE  
LTVFDSTGIAILDVAVGALAYERAKKTDAGVEVKPFELPTGNFK

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<SEQ ID No.:1412;PRT;Methanopyrus kandleri>

VRGGLREFLYDIDQRRWLRVRDHHVVCVGFGRVGAQAAGRLRAHGFDVWVVDTS  
KERVERARREGSVFPTVEGNLTDRRTLERAGVDRARFVVCTDSDETNVYVTLVLR  
KLNP DARVIAVARDPENADLLPHAGADEVVDAYRVAGEEAVERVLAHSFTVTVRH  
10 DLDEVEKEWRTIXVENG GTILDVRFHVPESPEEPIVKELPVESPEDLQRRKELLGTS  
EEFRSMAEALHELCRGAHSHRVFVADPSDKERIVKELEKLGFLIGVDLSHEEVLDR  
FRN

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<SEQ ID No.:1413;PRT;Methanopyrus kandleri>

LDPVFHVAASYALARAAGYPVRTSLMYAFGINVAIDLHLLRYRWILHSPVALLAGVA  
TAYAAGLRTGLVLALYTFHLLCDALAGMKGAGTGVAMPFPFSLKSYGLEAYVLLGP  
KGISWSLAPIARSSEAGPAGFLVSGVGLATTLGVVIFELLGVFKKRRELALAPPV

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<SEQ ID No.:1414;PRT;Methanopyrus kandleri>

LSAIMFVG TASNSGKSFLAAVTCAYLRQRGVDVAPFKSQNMSLNSCVAKENGEIAV  
AQAFQAAMAGQEPSIHNPVLLKPKGELRSEVIVHGKPIGTMSYREYREIVFEDPW  
QAVLESAEILSEEHEVIVAEGAGSPA EINVLDTDIANLRVAEALGADVILVADISRGGA  
FAAVYGTIELLPERWRRLIKGFLFNKFLGDESLLP GIKELERRLGVRVYLGTVRHVGD  
FWMPWEDSEALDTHSPGRG SVRIAVIRLPRISNFTDFEPLAMEPDVRVEFVDPRDN  
25 LPEDADAVILPGTRTTISDLEELRKRGMDEEVQAADEGTVVLGVC GGYQMLGREL  
VDESGGELDPGESVPGLGLLDAVTVFSPDAGKVTVRSEGVVNHPHLRGIRVEGFEI  
HEGRTYTDEPHLVRLRSGYGNRGCFLDGAYRTDRPVLGTYLHGIFNRRFRHEFLR  
WVSGGRWKPPERD VVREAVKRN LQVALEIVESTDLPELLGE

30

<SEQ ID No.:1415;PRT;Methanopyrus kandleri>

VDLDR LKVSSFERVTRPIEPKDSGLITERLGLLP GHRVFESGVGSGFLTASMARIVY  
PEGEVVGIEIDTRKLEKARENLEQLGK VYEKSVTLKHGDAREYLEGLEDEFDAMVLD  
LPEPDRVLEVGLDALKSNGKVAVFCPFFEQVRAVWQVLED RCTWLEAVELIERKLQ  
VEKRGIRPGRTLGH TGFIVFGRV

35

<SEQ ID No.:1416;PRT;Methanopyrus kandleri>

LKRIAVYGKGGIGKSTIAANVAAALAE EGYRVMVLVGCDPKADSTLTLAGRRIPTVMH  
EYRRKGEG LKLEDIIVEGDFGVLCVESGGPKPGVGCAGRGVLKALEMLTRMGAFE  
DVDVVFVDVLGDVVC GGFALPIRRGYADTVFVVTSSSEPMSLYAANNICRGIAEYADR  
40 GGAKLGGVIHNRRSRDSDSRVVTEFCRRIRAE LIYDLFYMEEV RKAESRYRTVIREF  
PDSDAAEAFRELAHRMLET EGVPQPLEEEEEVLRLAGVRF

45

<SEQ ID No.:1417;PRT;Methanopyrus kandleri>

VRFVRKEITVVVVI AVIVLPAAGYYEVNYGRG SVERPVV TYGETTWRTTELPTAVELF  
KEVGVDPTRFHRTIVTAEETNRVAAEVTGRRYTPSQIYSCATVTPYDEPPRRYQEV  
EGYRIYVGPEITVCKPETYAEALASIGAPPCVTIRSPVRATGEAALAGVYKAMREA  
GVEITDRDARFSQAVLEAVKGAGDDPRRRAAAVTVVVCVFRGADDPQKARDVQD  
EVENVYGVNLPPETAVHAAQA AAKLAEEGA EYSWWWL FKRLLAYWI

50

<SEQ ID No.:1418;PRT;Methanopyrus kandleri>

MAKYEPVIPLEVNPEGEVSKIAEFLRGKFEEAGREIAVVGLSGGVDSSTTLGLAVE  
ALGRENVALILPERDTPEEDVEDAVEAAERFGVEYHVHDITEVLRAFGTGSYPCH

PFSRKSDANLKPRVRMCVLYYFANELDGLVLGTGNRTEWLTGYFTLHGDGACDVA  
PIRHLYKTQVYVIAEHLGVPERIVEEKEPSARLWPGQTDEGELGIDYPTLDALLYALV  
DEGLGPRKAVDWLGERGVEATEEDAELVLDLVRSSSFKRRPAPGLDLPEPEDPAM  
SG

5 <SEQ ID No.:1419;PRT;Methanopyrus kandleri>  
MEKVVLEFGCEFGARLWVIQQVICILVSSLVIPILAHHTVRAVRRHDLDCALASFGML  
LLILAAGVITPLNTLLHLYSPRIKWGIILWTYIGSLGAGMVTFGMGFMFKVLTTRPAAP  
FGGERS

10 <SEQ ID No.:1420;PRT;Methanopyrus kandleri>  
LIGALLASHSYPTAVTWDILAEIAEILPSSITISCTDPDIWEFCIELRDHVEFLDVEEVDS  
LDPTTVVALAEAAHMGPKVLRTRVRGVVIVTDDPERAAEDWRLPAVSAREIYVPV  
VRVGGNATVHVYRHGEVLWRLGLREGKTLPPDYKSLRELLWNEFPYVRTIGSLAQ  
15 RTNWHEVLVRLALIEEWIKGNKLVSEFLDWIPKSTKVIPRSTDSPDSSSGENLLEG  
RLILIPAFSSTLSALA

<SEQ ID No.:1421;PRT;Methanopyrus kandleri>  
LFKSRRLPSFLIEGKVDEELEDFTDDFGQPDLDIVRACVDRLDPHPDLEERVLTAKTA  
20 RKACERIGFPMGEHAEFDLYPWLAPQIFHERVVRDVYSGESREPGEARVAFVSVH  
HDKRGVAEYVYRTLERLEPEAVCLETSPAGLETAHYTLSPHAGIEVMARVPTK  
MLMGPFRLDYALVYCLREGVPAIPVDVPSSLKLKESRKNPECLRDPVFEYTSEVE  
RVLGPTGELFFREYEEVEPVLRLGGEIRTNVSLVASETFVRFHLEFRERYMLSRIA  
DVTEDFDRVAVVVGAVHTSAMERAWREGEFRYLEPSPEDFKGVEWELSPRYKRH  
25 KLVVGGRRR

<SEQ ID No.:1422;PRT;Methanopyrus kandleri>  
VIGVVVLGATGRMGRRICRMVIEDEEELVGAIASPTSKHLGRDVGLVIGVGETGVEI  
APPTALPNIAKDADVAIDFTVREATLENAPKAARAGLDLVIGTTGFSDEDLRVLEHEIE  
30 EAGVSAVISPNMSLGVNLLFELTRQLARVLGDNGFDVEIHHHRHKVDAPSGTALE  
LAAIIIEELGKGEKVFGREGNVGPRDDDEIGVLAVRGGEVVDHTVMALGEYERIEL  
THRALS RDAFAK GALVAAKFVVEAPPGIYSMRDVLFGGKRGEGL

<SEQ ID No.:1423;PRT;Methanopyrus kandleri>  
MRRVLVLSIALMALAAPGLAEDKAVTATTEQQSQQAQTAEQQTEQQATAPAPKTV  
35 TLKLTPSLQADFTVDLKNGEAVLTLTGGYSLVTEGQDLLSDVLTAALAGINTIVAPID  
GKELLPGVKLEAGVEAPTVTAGLGEDCGVTLTATVLKVEVPKLEDLEHEWSETVTE  
DPLKSGISVALRLLHTAEFPFIKATLDLLTGALKVVVHLFELEVGSPESEDYEGPYLELT  
PVNVSEKLNDNATVTAYLGASLSASTLKLSPITITYETTTPLKLPVTLPEITLYTFQLPA

40 <SEQ ID No.:1424;PRT;Methanopyrus kandleri>  
VPGEAPVEDYDPKEIEPKWRERWLEERKYRFEGGEDRPAFVIDTPPPYPTGELHM  
GHVLNWTYMDVVARYKRMCGYDVFFPQGWDCGLPTEVKVEEIHGITKRDAPRR  
EFRKLCEELTLENIRKMREQLIQLGCSIDWWTDCIDYENEELKELGSYVTMDPDYIR  
45 RSQYGFFLELLEKGYAYREEHPVNWCPRCETAIAFAEVEYVTRETYLNYIEFPVADG  
DGSVTIATTRPELLPACVAVAVHPDDDRYSDLVGKKLVPLHERFGDRDTPWEVPV  
IADEEVDPEFGTGIVMCTFGDKQDVAWVKRHDLPVIRAIDEQGKMTVEVAGEFAGM  
EVEEAAAIVEALKEEGYLVKREKITQNVGVCWRCKTPIELVKEQWFKVRELAE  
VKEAARKMWIPEHMRKRLEDWTESMDWDWCISRQRIFATPIPVWYCKEAGEVIP  
50 AEKQDLPVDPTRDDPPVDECPKCGCSEFEPETDVMMDTWMDSSITPLVITGWPDEE  
PDLVPDLRPQGHDIIRTWLYTTVRALVHADTEPFKEILINGMVFGEDGYKMSKSRG  
NVVEPTEVIEEYGADALRYWAVSSGAPGSDVQYMTKTIKRGYRFAKKIWNVCRLAK

- 5 DHIDDAPSVEEVEGDLTPADRWILSKFHRLVDEVTEHLESGYRFNDAIKAIEEFAWE  
ELADDYLEMAKLRLYRPEELGEGSREAAVAVLHVLDGLLRLLAPFMPFVTEELY  
RLFDESVDQAWPEASEKWIDEGVEEVGEILREIVTEVRKAKTDAGLRMGAEFEG  
TVHVQDEELAESLEKAIPDLKSATRAKEVEVEVGEPKLERVPVKVEPRMDVIGPKYR  
ELTRDIEYVENNPDEVASAIKEDGKAKLEIDGKVVLDDEECVDVEWELRVKGGEGK  
AVEIRPGVWEIRGLST
- 10 <SEQ ID No.:1425;PRT;Methanopyrus kandleri>  
VTVLNSHVHSPTSRTFLLFLAAWLLLSFLMMFLYFVSIPGFFHALGLEPRTALLSLL  
SIVGSANVPKIRIKLTVQHETYGFWGISYQVPVRRSEEIVAVNVGGCLIPVAVSV  
YLIATNLDLWLQYLLATAVTTIVSYATARVIPGVGIAVPFFLPAAVAGTVALLTTKGA  
ASVAYVAGTLGTLIGADLLNLRKAVNWGSAPVLSIGGAGTFDAVFVTGLTAVWIAYV  
LSPGAGT
- 15 <SEQ ID No.:1426;PRT;Methanopyrus kandleri>  
VDRVRPLAGGRNVRIEAVLNIDPYVPGKSKEEIAREYGIEPDEIVKLGSNENPLGPS  
PKAVKAAKRELERLHEYPEPLAPPSLYEAIIDYLADPPYPAGEPVEITREHLVVG DG  
ADEIIDVLTRVLVDPGDPVPIPVPTFSQYGISARACGAEVRKPRFDPERGFELDEDSL  
FEALDREVRLVYLCTPNNTGNRIRERVWRDVVEECRGVVLIDHAYVEFADHDYTPL  
20 ALEYDNVLVLR TCSKALGLAGARVGYGIANPELIEHLHRIKPVFSLTRPSAAAAEATF  
RDRDYIEKSVRLMIESRKLYRELRLKDLRTPFPSEANYLLVDVSN TGMNASEFTTE  
LLKRGVVRDCSSFEGIEPFYVRVSTGTLEEDRK FIEVVKDVLEV
- 25 <SEQ ID No.:1427;PRT;Methanopyrus kandleri>  
VTRLSLPTSRHCEGCPGAEGEGPHHPTLELTSCPYKCPHCYARYAENVGVVVKP  
GLYGEPQGCLTVSQYGEPTVLGRELIDVLEMVRETGLFDRIDLQTRGYRPDLAPKL  
SEICDLVMVSIDVTDPDVHRLHGVGPERTLRFVNTDRPVIRSLYLPGINDDL PQG  
LADTEIEPAEVFVQPLIPFGKAVENLKRIGLRDHYNVVGSLLNWAEKFEEFGFVRF  
PACWVDSLRLKERMEEELGFVDLRNVRYSPDPGTPAPERFTPLRELLDELVR
- 30 <SEQ ID No.:1428;PRT;Methanopyrus kandleri>  
VQVVGVPNPTRFLTIEAIERIARADLLISSESILREIDGLRVEAEIDLSDKEVVTWNG  
SVRETLTEYADSDPVVARGDPTYMGVGRLASLLFDDVEIVPGVSSLQALTARFGR  
GFHEVEAHVNLHSEEDVEKVVESLGAGRTTAVLFGKVRPAKVETIESVGLNVK VIA  
35 GERLWYPDERLATELHSLRNFSEFTVAIFEPDHVIETSLR
- 40 <SEQ ID No.:1429;PRT;Methanopyrus kandleri>  
VRGEETLAEVLTMDRTLASN YRGGMFMGFSACVPKGIIPDWLYFSVFCPSVEYDE  
ETGEVKEAPLGIRRIEAQLRREGYDVAVVHPDAVHKAIDEDTIAVGVSEIDPQGMGP  
ATTTFTSFSGKPAYMKVCFEDLMERIRELKDRYGFVFMGGPGAWQVAETFPFRFG  
VDFLMIGEGEYVVG EVVRRIEEDRGLEIVRGKPVA AEDIPTIVNPTTNGIVEVARGC  
GRGCKFCSPDMRELRSFPLSKILEDVDVNVVRGGHEEILLHAEDVLRYKADGWRPNV  
EAVLELFSAVMNRPGVKRVS VSHVALSTVCQFDERLGEISEVAGVGELVPWMGAQ  
VGVETGSPRLMAEHMPGKVAPYKVEEWPDVVEQAFGIMNDHGWVPCGTLILGLPG  
45 ETEDDVMMTVELLDRLDYKSFIVPLFFVPIGESRLSDHDFFTPEKLTEVHWEVILKC  
VDHDLKWLP ELYEEYARANGHG PLVKLTIRALTWYGRRKIFKSALKWCPEKELVEA  
VLG
- 50 <SEQ ID No.:1430;PRT;Methanopyrus kandleri>  
MECRVKVFLCADGRPVMGPGRYALLKAISEEGTVKGAAERLGWSYGYARRSIEAL  
ERAFGRKVQTERGGPEGGRASLTDFGRKLVEEYERAMKEVREKGLKPIL



- 5 <SEQ ID No.:1431;PRT;Methanopyrus kandleri>  
LNAKIVHISDLHISPYRKSWSPFVYRGIEQINDLRPDVVITGDLTDNGLVREYEEV  
SSLLEKIEAPVVPVPGNHDA RN LGWMTFEDVFGDRYRVERVSADLYVVG L D S S E P  
D V D Y G Q L G R E R Q E W L E E T L R R I P G G A C K C I A M H H H L L P V P G A G R E R N V L V D A G E M  
INLCIKYGV DLVLCGHRHVPFAAKVEDTVV NAGTFSATKLRGYSRNSFN VIEFSES  
TVSVNLYEITTEKLELARYKPVVREGEYRLVRVKG IADILRESA
- 10 <SEQ ID No.:1432;PRT;Methanopyrus kandleri>  
MNVVKEGWPDAPSHVCRGGPPEALAFCCPPVKPCPIFHALDEAGLDPEEYVRRKK  
EFAEKTPLGSGKNTCFGSLVWCKKITKPCPLRDSTLQRIGMSPEEYMWKKKLAE  
YLLGKKDLDEILRETSESEPEEETVEVVAEAAGVSEEEARRALEEANGDPVRAVKLL  
KSRGKGD
- 15 <SEQ ID No.:1433;PRT;Methanopyrus kandleri>  
VSWVIRVEDLVKEFEDFRLEIPELEIGEVLGVLGESGAGKSVFIHVLKGLDDYEPD  
EGRILYRVGMCPECGWIERPEFIDGEQCPKCEKGKLEEEVVDLWGLSDTERRRFRK  
RIAIMFQRTFALYEEQTVLENVMEALEEAGYSGEEAVQRAVDLIEMVQLEHRITHLA  
RDLSGGEEKQRVVLIRQLAKKPIVFLADEPTGTLDPETADIVHKALREGVKEEGITMVI  
TSHWPEVIEDISDKAVWLEDGCVKEVGEPSEVVSKYLELVEEVEREEVEVGDDIIRV  
20 KDVKKYYSIERGVVKAVDGVSLDVKEAEVYGIVGKSGAGKTTAKILAGVLEPTG  
EVYVRVGDDWVDMDTDRRERGRAKRYIGMLHQYTLYPHRTVLENLTAKIGIELPDE  
LARMKAVHVLKVVGFDKKA VNILDKYPDQLSEGERHRVALAQVLI REPRILILDEPT  
GTMDPITMRKVAKSILNARKEMNQTFVIVSHDMDFVLMVCDRASLMRDGKFVKTGD  
PEEIVRELTPEEREEMIRQE
- 25 <SEQ ID No.:1434;PRT;Methanopyrus kandleri>  
LKPIRVCPECGKYTEKHTCERCGRRTTEFLDGRRLALS KLLSGILRHFPEEVKVKL  
DDEGFTDCDVHELAERIKKYWKNREYYRWLTGEHIIAVVETCPKGRFEIDEHGRIRA  
RYGHSRRLSVRPTLPEAENVKELYHGTARENLESILQHGIKPMGRRAVHLTDDERE  
30 ALITALRHTRNPVILVDAERLRRHGLVPRKAGKNVYVVEGTVPPDCITRVIRNPRRS  
VESEKR
- 35 <SEQ ID No.:1435;PRT;Methanopyrus kandleri>  
VKSAEWFEASTEEERVEIQRKVARKVRLEPLDDVDAVAGVDVSYRGEEYRAAAVVL  
DPETYEVLD RR VVHGTTDVPYEPGFLAFREGPPALEALEGLDFDLLFVHGHGVAHP  
RRAGLASHLGVALDVPTIGVARRPLVGRSKEEPSRIGD TTPLVHRGEVVG YLVRTD  
AEARPVVSPGHRCNLEDAVRWTLRLVRVGKWPEPLRLADLLSRRGASRVEGESR  
GAGVRR
- 40 <SEQ ID No.:1436;PRT;Methanopyrus kandleri>  
VALVYDAEFVGSEREFEEERETFLKG VKAYDGVLATRYLMERSSSAKNDEELLEHL  
QNFILLTGSYACSIDPTEDRYQNVIVRGVNFDERVQRLSTGGSPARYAIVYRRGWR  
AIAKALDIDEEDVPAIEVRAVKRNPLQPALYRILVRYGRVDLMPVTVDVPPEMAGEF  
ERLIERYDVPIDEKEERILEILRENPWTPHDEIARRLGLSVSEVEGEKDPESSGIYSL  
45 WSRVVVNIEYDERTAKRHVKRRDRLLLEELYEHLEELSERYLRHPLTRRWIVEHKRDI  
MRRYLEQRIVECALKLQDRYGIREDVALCLARAFDGSISMIATTPYRTLKDVC PDLTL  
EEAKSVNRTLATLIDEHGLSPDAADELIEHFESIAGILATDLEEIERMYEEGR LSEEAY  
RAAVEIQLAELTKKEGVGRKTAERLLRAFGNPERVKQLAREFEIEKLASVEGVGERV  
LRSLVPGYASLISIRGIDRERAERLLKKYGGYSKVREAGVEELREDGLTDAQIRELKG  
50 LKTLESIVGDLEKADELKRKYGSASAVRRLPVEELRELGFSDDEIAEIKGIPKKLREAF  
DLETA AELYERYGSLKEIGRRLSYDDLLELGATPKAAAEIKGPEFKFLLNIEGVGPKL  
AERILEAVDYDLERLASLNPEELA EKVEGLGEELAERVVYAARERVESRRKSGRQE

WO 03/076575

RSEEEWKEWLERKVGEGRARRLIEYFGSAGEVGKLVENAEVSKLLEVPGIGDEAVA  
 RLVPGYKTLRDAGLTPAEAERVLKRYGSVSKVQEGATPDELRELGLGDAKIARILGL  
 RSLVNKRLDVDYELKRRYGSVSAVRKAPVKELRELGLSDRKIARIKIPETMLQV  
 RGMSVEKAERLLERFDTWTKVKEAPVSELVRVPGVGLSLVKEIKAQVDPAWKALLD  
 5 VKGVSPELADRLVEELGSPYRVLTAKKSDLMRVERVGPKLAERIRAAGKRYVEERR  
 SRRERIRRLRG

<SEQ ID No.:1437;PRT;Methanopyrus kandleri>  
 LGLDEIVNGFPLKEEWVYLDNAATSLKHHERVISAMERVLREFGVNVGRGAHPPGEC  
 10 ATEEFERARDIVASFLGVEPECLAFTLNTTHSIHYVLASIRWKKGDVVTTALEHHSN  
 LAPWLRFSVLGFEVEVVGFDRETGEVDMAELESVDDNTRLIAITHESNALGSLQP  
 VDEILELAEVGAAYLLDAAQSLGHMDHDSRYHFLAAPGHKGLLGPHGTGILYVR  
 EDVMEELRLLLGGGSTDYVTRDLEVVPREPPLSFESGTPNLPGVIGLAEGVKILEE  
 VGLNRVERRIRKVTRRILNGLEELEGVEILAPEAERKTIVPFLVDGVDYAIEVGKKLGE  
 15 RNICVRTGRHCASLVFERLGLDGCVRASVAFYNDIEEAERFLEVVEEIRGS

<SEQ ID No.:1438;PRT;Methanopyrus kandleri>  
 MGGSESVPVLLPFLEDPLTMFSPSRVIIPSTRYIMEVVRDLRAPWRGEVLDAGAGC  
 GSFALTVAALGPYTVYAVEPDPEHSAALSANVSANRDVLLGDVLPLECSIEDFRRPV  
 20 DEVLTDPPWGLRSGISRTPDLEFVLSFLDACVDVLRPKTGRLVTRCPPEFIDDIVDH  
 MSERGYLLDRVKRRHKAAYLVLRSEDHRDYDDRESAVAAAGGQVLVAWEGGEL  
 DPEADRYSLVTPYESGWHVWEVPNTGRIREFLRGFLKGG

<SEQ ID No.:1439;PRT;Methanopyrus kandleri>  
 VSELFERGHWSYWCVPVWYCGFPFLLYPPLFYLVGGALNLPLGDPVQTLRILGLTA  
 25 VYLLVVGIFACRQLGFTTFAALSTLLFLTSPSILWEINRGGIFPMMMSLGFGLLALG  
 LLERTLSRGFTPKSALGVIALITLSLFTHPIGGMTCCGALILRVLLLEVPEGSLRPNQ  
 WFRALTDQRNLPLLLPAALPLLLAAPQYLPMLLYRGYISPLVTPAPQTPLDCIVTLLS  
 CPMWSPLPFFILLSVLGAYYALRRSGPGIRLYGALTCLIFCASVFSLLAFWSIYKVAP  
 30 GGQLITHRLPGVLFPLFGALILGCVIRHRPKVFATLAIPQLLLFAVYVWSYTQPVLDL  
 SVREGHIPSPVHLWKAMDLLPRCVGAGLTSPQSLLWTLVAAGGFFTLDTKPTEDA  
 KCALHYLRHQGGPYDRVTFDPFTHVPLYRCDASFVPIESGHYSLLGWFNQGDPAF  
 YSLAWYVEWQHSWVFYPNAVLTVFHLANVRYVISGSPKWTASLERLPEFHRLTDF  
 GRYTVFSTSVSPGPAELVPRPILVIDDILRRPNPYTMMVNIIPDGGTRRIFVEGSPED  
 35 VARFRQIIVRTDRPDTLDEVLRKMKSGRVLVIVPANDYATARYLAERFGLHVRPVIVC  
 PWEPLPSMKVCNRLIDAYRFVGITVPGATPEERTWFLFNGRPWVDVKLGKVEVRV  
 CGVDFVDLAGTLHQTLYYGAGAYPLPPKWERALLNEVLRGFDGKPRPVKFKAVE  
 PDDVRVRGKGYILVKIGYHPAWHANAPTYRSGGLIIVRSTGVTRLRFGFTWWERM  
 LWWGAFAIGLMGSTWLYLRGRDEGR  
 40

<SEQ ID No.:1440;PRT;Methanopyrus kandleri>  
 VGKTMAEKILSRASGEDAEAGDIVVANIDVAMVHDITGPITVQRLEEMGVERVWDPS  
 KIVVLFDHQVPADSVEAAENHKIMREFVEEQGIEHFYDVREGVCHQVLPEKGHVRP  
 GDVIVGADSHCTHGA LGAFATGIGSTDMAAVFATGKLWFRVPETYRVEITGELPE  
 45 GVIYAKDVVLKVTGEIGADGATYMAIEYHGEVREMSVSDRMCLCNMAIEMGAKTG  
 MVPPDEKTLEYVKKRAGTEGRPVEPDPAARYEAELTLDVSDLEPQVAKPFSPDNV  
 PVGEVEGIAIDQVFIGSCTNGRYEDLKVAEEVLEGEVHDDVRLVIVIPASREVYHRTL  
 KDGVLVLHEAGALICPPNCGPCLGGHMGVLAEGERCVATSNRNFPGRMGHRES  
 EVYLASPATAAASAIEGEITDPRPYL  
 50

<SEQ ID No.:1441;PRT;Methanopyrus kandleri>

- VPRSRGAILTSDIDRLVEKLAEVVGKREEEVRREINRLRKRWGVSELGALLALADRM  
GVKLMRTGEEKPGRVTLDEAISRLQSFDFEFIVRVSDPAKTRSGGKMVTLVVG  
ETRSAALVAFDEAVETLEEELEEGDVVRARNLTVSSFRNSPQLVVTRETELEVVGSE  
EDPNRIIERNISEVKHGEYVRVRGVVASEPVDTERVYFWLSDETGSTRVNLWGEE  
5 AERALDL DYGDGVIVEGWVSTRGDHPTINILRTQGRVEPAEVSIPAIRKRVEELGK  
GDVAEVS GVVAVYARRRYEACPTCGRAMRKGECEPHGAVEPERRPVLNVVDD  
GTGTVRTVFFGEHAVEFAGYETTREYLEADESDIEKRLLGESVSVLVRVREGGVVE  
DYDAVALRARILNEEDFKREIPILVRELKGESESEGEAE
- 10 <SEQ ID No.:1442;PRT;Methanopyrus kandleri>  
VKERKLSDDLPLDET VKKLEEKGI VTVEDFIYADPKYLSEVTGMSERDVEDIQEELR  
NIDVEFETLEKLERKRRRITTGSSALDEILGGGVPCGELTEFAGPFGSGKSQIVFQLC  
VNVQLPEEEGGLESKAIFIDTEGT VSPGRIKGM AEALGLDPGEALRN VFVTQVRSVE  
EQMRAAEEAHKLCEREDIGLVVIDSLTAHFRAEYSKLGDVSERQARLMKHVDQLRN  
15 LAMDHDVAVVFTNQVHVDIEAATKGKGRRYEPVGGTIVAHQATHRIMLRRAKGEVR  
IARIIDSPYLPQREAAFRITEEGIRDVEFPER
- <SEQ ID No.:1443;PRT;Methanopyrus kandleri>  
MEFDVVVVGAGPAGSVAAWAAAEAGCDVLILERKAEIGVPKQCAEGISARALEEVGI  
20 RPDDGWIAAEIERGILSLPSGSKFEVEVEGYVLERRVFDKWL VVRAVEAGAEVELLA  
HARRALLDEGRVVGVEYEGEDGVHEVRARIVIAADGIESRIGRTAGLVPQLEPDHIC  
TCAQYEVVGDYDPKAFMIHFDPERIPGGYAWVFPKGENRANVGVGIRGSESSPG  
LALKTLDELVEGPLSELVAGTPVEVNVGGVPVCGPVERTYGDGILLVGDAARQVNP  
LTGGGLNTALICGRIAGEVAVEAIEEDDT SASFLKRYQDRWEEEFRTDFECAREVAE  
25 MLPELDLKEVVEFLSSVENLEEMLR TSGILEDVWWG
- <SEQ ID No.:1444;PRT;Methanopyrus kandleri>  
MPDVRRCDFCGRIIEPGTGKMFVKNDGTILWFCSSKERNMLKLGRDPKKVRWTE  
KHREFMAEQRGEL  
30
- <SEQ ID No.:1445;PRT;Methanopyrus kandleri>  
MVECDYDPTEDATPAEVVEILGRTGMAGEVTQVKVRILEGPDKGRIITRN VKGPVRE  
GDILLRETEREARPIE
- 35 <SEQ ID No.:1446;PRT;Methanopyrus kandleri>  
LPEFKVVADPEKARSYQVEVKGEDAEKLGKRGIDVIDGEIVGLPGYKLKITGGTDK  
DGFPMRPDIHGPRVRLLLSGPPGFRPERKGERRRKTVRGNTISEDIVQVNTVIVEY  
GDKPVEELLGEGGEE
- 40 <SEQ ID No.:1447;PRT;Methanopyrus kandleri>  
VDDERFQQAEMNIGMVGHVDHGKTTLT KALSGVWTDTHSEETRRGISIRLGYADTV  
LTRCPECDTYSVEEKCEPCGAETEWLRRVSFVDS PGHETLMATMLSGAAIMDAAIL  
VIAANPCPQPQTREHLMALEIIGTEDVIVVQNKIDLVTP EEAREHYEQIVQFLEEETH  
LDPDKTPIIPVSAQH KANLDVLVEAMYEHFEPPEYDL DAPFRMYIARSFDVNKPGTR  
45 PSDLKGGVIGGAIVQGEVEIGDEIEIRPGIRVERYGRTEWEPVYTEVVS LHANVTPVE  
RARPGGLVGIGTKLDPTMTKADRLSGQVAGEPDTLPPVRHELLLEVELLERVVGTE  
EERKVEPIRTNEVLMLTVGTATTVG VTSARDDEIEIKLKQPVCAEEGDRVAISRRIQ  
RWRLIGHGVIKG
- 50 <SEQ ID No.:1448;PRT;Methanopyrus kandleri>

VTIRVVLNANFLMIPHQEGVDVFSELDRLLGSRPIVPRQVLEELERVKRAATGRDKI  
AARVALSLVDAKGIEVVDVKGRDGDEAILNLARRWDRVYVGTRDKELKKRLWKLG  
PVITLRQRTHLVIERG

5 <SEQ ID No.:1449;PRT;Methanopyrus kandleri>  
LEVPPSPVLSDALGKRYVLRGIRHIVGPVPICGRAVTVLVEGTDWGTVEAIDEAEE  
GDVLVIQARDRARAYWGGGLSSLSAKRKGLAGTVVDGLVRDVEDDREIGYTVFARG  
VTPRAGTHRRSGKINVDLYVSGVLVRPGDIIVGDESGVVVPEEEWEDALKRAREIL  
ELEDIRTIDIAANRAWWEIVPDKLGGW

10 <SEQ ID No.:1450;PRT;Methanopyrus kandleri>  
MMNLWKDLEPGPNPPDVVYAVIEIPRGSRNKYEYDEERGFFKLDRVLYSPFHYPLD  
YGFIPRTLYDDGDPLDILVIMQDPTFPGCVIEARPIGLMKMLDDSDQDDKVLAVPTED  
PRFKDVKDLDDVPKHLLEIAHMFSEYKRLEGKETEVLGWEGADAAKEAIVHAIELY  
15 EEEHG

<SEQ ID No.:1451;PRT;Methanopyrus kandleri>  
LYELVELETTVRIPPTQFTSDVEDAVLKALENDVEGKLFREDDTGEPIGFVVFVDEIL  
DVENEGIFPGDGASYHRVFRALVFRPVEREVVGEVTRVKEYGAFVRLGPLDGLL  
20 HVSQILDEYMYDGAREALVGEETGRELKRGDVIKVMIIIGVSLNEERPRDSKIALTVK  
RPGLGKPEWWE

<SEQ ID No.:1452;PRT;Methanopyrus kandleri>  
LSKLKACVRCGYLVEEDTEICPACHGDEFTENWRGIAVILDTESQTADRLNAKIPGK  
25 YALRVEE

<SEQ ID No.:1453;PRT;Methanopyrus kandleri>  
VTVVLRLPRELRLRPWGTLYPRPSIKTYRRLHEESEVLITVGDMTTRSFLRCSIR  
PDVAVVDRKMLRTPVDPGNKFPVTLVDVNNPPGTITREAWDTVRRGIDYALDGDAT  
30 LIDVTGEEDLLAIPAILIAPENSIVCYGLPGEGMVAARVTQHLKDSVLRLLTRFRGYDE  
WKSRSWISGITPCCTAKR

<SEQ ID No.:1454;PRT;Methanopyrus kandleri>  
MEVEILDQRDNPLLYRKEVKFVVRHEDSGTPQKSEVLRKLAAILDVDKEVVLIDRME  
35 SEFGKRETKGYAKIYKSMEHLEDIEPEHMVERHKKVLEEELESESESESESESESE  
EE

<SEQ ID No.:1455;PRT;Methanopyrus kandleri>  
MGVPRRAKLYEVKDGKVERKNPFCPRCGPGVFMADHGNRYACGRGCTEFDKQ  
40 PEPKKKK

<SEQ ID No.:1456;PRT;Methanopyrus kandleri>  
VEAGDVIALGAESLLVRHDWLGLLAVYKIRLPKPYRHPSLDERLRLRLTRREARALIR  
LPEMGVPTPTLYEVDLDLSLLITEYIPGRTLKQATESSFDPDHYRKLGLVGRMHEH  
45 GFVHYDLTTSNVLVSGDDLYIIDLGLSEDSDDPEDHAVDLRVFERCLESSHPEVKEEA  
WRAFLRGYREEREATDTVLRALEDLKSRYI

<SEQ ID No.:1457;PRT;Methanopyrus kandleri>  
MTDLNLSLFRDCRFVLEELGCVVEEVDSDYQLDFVRSDDFCFALVCVGGLSDLA  
50 SISALGEWEEGLAEIARDAEALGLGALVFPREPREEVSVSAFCEHYGLGLAVTE  
WETLPLEVIEDPFRLDYGSATEVFLEAKLGRIPEWPDTEPLEDLLVGDRPVTGPDVV  
QVVKREVS LDWRDLVMRLRWAGYSGEGLSEALYSALMSDEVEMTEDGELMHVPE

RLSEVLGALLVWLQNRGRVPEDEVYEFLFAQFGVPYDVTYVALKKLEERGEIEVKR  
GLVVAKV

<SEQ ID No.:1458;PRT;Methanopyrus kandleri>

5 MICVGIESTAEKLGVGVTDDGEILVNVKAQYIPPPGSGILPREAAEHHSRELPELLE  
RALKNAGVEPEDIDLVAYSQGPGLGPCLRVGATAARTLALTLEVPLAPVNHCVAHV  
EIGKLAARQDGFDFDEPVTLYVSGGNTQVLALKAGRYRVFGETLDLPVGNMLDTFA  
RKVGLPHPGGPEIERLAEEGEPVELPYTVRGTDVSFSGLLTAALRRYEQGDRLDV  
10 CAGLQETAFAMLVEITERAAAQLGRDEILLTGGAANRRRLSEMMHEMAEDRGAEAY  
TVPPELAGDNGAMIAWTGILVHEHGLSIPPDEIPEKAIVKQRYRVDEAPVPWAARPS  
RSADSQG

<SEQ ID No.:1459;PRT;Methanopyrus kandleri>

15 VRYKPLRFELECVEPGALPRFKGFAVRGMLLRRLKERFPGFVRRFLYGNHPIPAVT  
QVPPLTDERMVDVGDIVSFRNLNFGDAVDRDYEIILALVDGELRLGSARFVLRVEH  
AETGEPVWDESAYRCVKPEKLDAREPVGRYLVVFTTPTYIVHDGKPRVPKFHMIV  
RNAARKFTMLHRRFGLEGLTRRQARNIIWAERAETIRMDYRFETLERRSARLGRH  
VVRTIVGTFVYELPPEPPDRVGEVLAFAEVYGVGKFN TAGLGRFVLGEAG

20 <SEQ ID No.:1460;PRT;Methanopyrus kandleri>

VELKFSAEVELTSLREVDPAEIEPTVEEFVKEANEDLLQRGVPTGKEGAKIESYRVLE  
DTIEMEITGTRYLRPHEAAMRVKRRLAERLGRKHRVGVRDLKIPRYEVVLRFDREVT  
RDDVGYPVADDVVVEDGTVRLTFQDVDEEMLRRHVIDRVIRLVAAVEERSELVE  
25 RVTKVEPGTVVDESGPREIRFDGDVTEEARRRGWVKEFPGRGQWIYTPPMAALFE  
VLRDFFLLERVTRKLGFEPALEPKLIPLTMRMRYLHGLPDGMYVVCPPKRDPFLFD  
DFKRELYVWGELNERTLGSLKEKLRDPGYVLAPAQCEPFYELLRDEVDPERLPIKL  
YDCSGWTYRWEGGAAGLERVNEFQRIEHVWIAEPEEAERIREELLEATKRVAEEL  
ELEWKVVVSDDPFYLEGRLLED RDIELPDVPSYEFVYLPFKGERSSEEAWISVGSF  
30 NVHGEHFVDGFNVKEKSGRTLFTGCAGLGVTRWVVGLLAQHGFEPEEWPEPILERI  
DEKFGGLPEVPKLTWPE

<SEQ ID No.:1461;PRT;Methanopyrus kandleri>

35 LVRDKWKDKVWYTILAPDMFDNVEVGETPADDPEKVIGRVLETTLGVDLDDITKHHI  
KVFFRIYDVEGTTAYSKFEGHRLMRDYVRSLVRRGTSRIDGVIDVTKDGYKVRVA  
GLAFTTTRAKTSQQRAIRKEMFKVIEENAKCEDFDEFIRRCLSISEEESIPEQIKEAG  
RKIYPIRQAEIRKTEVLEEPNGLPPYEAVGDRATPELAS

<SEQ ID No.:1462;PRT;Methanopyrus kandleri>

40 MFLVKTQRNLEDVAAAMIEEETGAEAKPRPFGYLGLVIVTGHVTKDELEKIPEVERAI  
PVEAECRADPKEIAETAELAETKISEDETFAVRTIRRGEDFTSVDVNVEAGDAVR  
KATGASVDLDDPDKIVWVEILRDRAVLAVLPGEEEWKKLPPGKPEADPLLAKLELAQ  
IPYLGDPRAAYSMGERIGRAVQGFELKSYIVTPYEPVNAVELLHFLRGLRDGVKSRM  
DVQRESYGREFRRTELLLYDLQLIRLKRDALIIGTDPKGDPTYEIRKTLGEALREAD  
45 EVVVLGSRVGLPRGVLRACDFVVDLCPGVTFATEHVVPVSVTALVDSYLEAEGSE  
DREG

<SEQ ID No.:1463;PRT;Methanopyrus kandleri>

50 VNRTGGSPGALPLEVGVVHLPPLPGSPRAKSIEEVVERARRDAARLEDGGVDAVL  
VENFGDTPYYPDDVPKITVACMTRAVAEEVDTVSVPGVNVLRNDGVAAVDVCAAT  
GASFIRVNAYVEAVATDQGVLPVAHMMWREIDRLGVDVEVYADIRVKHGRPLDDR  
PVEEVARDAVERGLADAVIVTGSATGSPPRPEEVKVARVVDRLVVGSGVTPENAH  
VFLRAGAAGFIVGTYFKKNGITENPVDVDRVRELVRFIRRSVERWP

- 5 <SEQ ID No.:1464;PRT;Methanopyrus kandleri>  
LALIQRRLNRRELEWVRKRVAREAAARLLYEGAVDEYIDAKRLAARRLGVDVMPSNR  
EVAIELDRIGDELEGEEKLHRLKRLREEALKVMEAIEDLEPRLIGSVWRGNIKRES DI  
DIAVLGTTDPEEVIERLKEAGIEVLDVEEVVITERGGKPLDIPEHYVNIKVRTPGGEKA  
EIGVTVSSPELERKGRVDLGRCDFFGDKITGLSVEELRKLLREDPYRKFI PRG
- 10 <SEQ ID No.:1465;PRT;Methanopyrus kandleri>  
LRVFIGVTGASGQIYARRLIEVLHEEGVDVEISVTRSAEYVMEQEGVDLPENVRRYD  
PKDLTAPPASGTYRIDAYIVCPCTLHTLSSVAVGVAGDLIKRAAVVALKEGRPLVFVV  
RETPWPRSALQAALKLREEGAVILPACPAFYHGPPTIEDLV DYVQKVLDTIGVEVD  
LVRYQPRGMNFR
- 15 <SEQ ID No.:1466;PRT;Methanopyrus kandleri>  
LILTPVIAVTGVLLGLLYAPISVVIAFLVETVLTSGLSGPYRLVIAAVVVAPIVEELSKGL  
GFLVVRVLAGALRLASRFPVIGPTVGTAAKVVRECGRRPVGTVTVAATTALGFGS  
MENVFYALVGLKFGLLGPIIVGVFVRTFTSLPIHVIATSSFGLLYGSLRRRWLGFAVG  
STAISIHA AFNFAAVYARYKATHGLIGT
- 20 <SEQ ID No.:1467;PRT;Methanopyrus kandleri>  
V FVAKYLG SARYSELDEELKDFARLKAHLAGVDLNRDPELMIFNVEGTSSYYIVFLE  
EVESEEDVERLLREDMGAELSRDSKASVRRVLNR
- 25 <SEQ ID No.:1468;PRT;Methanopyrus kandleri>  
LKAQWVALNEVVSELRARGE EVPGEVLENLRTARVILHHYEFDPHTSARTLGKAHK  
YLDRAQRALARICESHPDLLDKLVEWPKRVKELAA RFREDTARSKFEPMPNRPVPR  
AGDGFARVRLPEPIEVERLQDVCEFAGVIVEMKEVDVVEVFGDRDRVGTALKE LRE  
LPESWKKMLEKRKSNE
- 30 <SEQ ID No.:1469;PRT;Methanopyrus kandleri>  
VIGIATADFHGDVEKAEQVAEKA ADEDADVIFVAGDVSDFNLEDPAQVAEEIVDVLK  
EHGQEIMAVPGNCDTPEVVRVLDTS GVSVHLKVKHIGRYDVVGMGGSNPTPFDT P  
LEFEEDVIESRLRELMNSTDEPVILLTHAPPKDTAVDKVEAGDHVGSEAIRKIVEEFQ  
PKLHICAHIEAAGEDELGNTRVINPGPGGTVVVEL
- 35 <SEQ ID No.:1470;PRT;Methanopyrus kandleri>  
VKVNP KFPWEREVIEFVRTEMSEVSPSHDFEHVKRVVGLCEFIRRKEGGDPEILRA  
AAWLHDIGRPAEERSGEDHAEVSAEIAEDLLPRVGFP SDKLGEVTHAIRAHRFSTGP  
EPQTLEAKILQDADNLDALGAMGIARCFCAVGERGTSLESGVEHFHEKLLRLPELM  
40 HTETARRLAEERRRRMVLFLEWLEKEWRMRS
- 45 <SEQ ID No.:1471;PRT;Methanopyrus kandleri>  
VADDEVKPIVRIADVLDGHKKVPYALTGIKGIGIRMAYAICRELGLDEEKKLGELSD  
EEIERIEEEEIKKLSEGESNIPSWMYNRQKDYETGEDMHLVGAELEMTVKQDIDRLKKI  
RAYRGIRHELGLPVRGQRTKSSFRRGRTVG VKKKQ
- 50 <SEQ ID No.:1472;PRT;Methanopyrus kandleri>  
MGDPKRPRKKYETPRHPWEAERLEYERKL MRKYGLRRKKELWRHQTQLKRWRE  
RAKELMARTDPEAQREREALFRKLYDLGILDKKPEEATLDDILRLTVEDVLERRLQTI  
VYRKGLAKTPLQARQLVHRHIAIGDRIVTPSYLV SREEEEEVDYSPYSPLKDEDH  
PIRCEARGESPEETA AEE

WO 03/076575

<SEQ ID No.:1473;PRT;Methanopyrus kandleri>  
 MAEKEGKKEKKERWGIAHIYASFNTIITITDLTGAETFARWSGGMVVDADREESSP  
 YAAMKAARRAAEEAMEKGITAVHVKVRAPGGHGPKTPGPGAQAAIRALARAGLKIG  
 RIEDVTPIPHDGTTRPGGKRGRRV

5

<SEQ ID No.:1474;PRT;Methanopyrus kandleri>  
 MSPLRVRLYDYRKADVERATFIIETSAEFVNTIRRALYTLVPTLRIEEEVIYENDTPMY  
 DEMLAHLRLGLIPLRVDDIDQFELPDLCDCGGKGCEKCQVRAELEVEGPTKVYARDL  
 KFDHPDVEPAFPDTLITEVGEDQIRILEVIAVPGLGLEHAKWKPVSAVGKGLPELEI  
 10 DEDKLKEKKITYECPQGIIRIENGVEVHIDEDRLPECRMVKEYERETDGAVRVRLRD  
 DAFVFNVEDTGSMSLDTAILKALDAIEHKLESLKKNLQKEVSGE

15

<SEQ ID No.:1475;PRT;Methanopyrus kandleri>  
 MTWAPTGPTNVELRKLIRDLLKKAACEYNAPVWRDVAERLSRPRRQRAEVNVGKLD  
 GLARRGVIQEEETVLVPGKVLGDGVITQPLRVAAWRFSRTARMKIEAAGGECLTIRE  
 LLEENPEGSYIRIIE

20

<SEQ ID No.:1476;PRT;Methanopyrus kandleri>  
 LVEYAHSKPVDPEEWTVIDAENAVLGRLASVVAKRILKGERIAVINTEKAITGKKNTIK  
 EEWLQKIQRGDPKKGPFYPRRPDLIFRRVVRGMLPWKTKRGREAFKRLRAYIGTPR  
 WVEEANIEPERVAEADMSRLGHLWYVTLGELSEELGYQMPGGQ

25

<SEQ ID No.:1477;PRT;Methanopyrus kandleri>  
 MGRVVQTTGKRKTAIARAVIREGEGRVVRVNRKRPVNIIEPEMARMKIMEPLIAGEDIV  
 SQVDIDVKVQGGGWSQAEEAARIAIARGLVEWTGDPDLRDAYMAYDRHMLKGGP  
 RRKEPKKFGGRGARARRQKSYR

30

<SEQ ID No.:1478;PRT;Methanopyrus kandleri>  
 MIIPIRCFTCGRPIAHLWEKYVELIEEEGMEPGEALDELGVDRYCCRRMFLSHVDLL  
 EESLPYTPPRLGMPR

35

<SEQ ID No.:1479;PRT;Methanopyrus kandleri>  
 MRVATLLTCMLALTGAASAGKYFEVTQTPVVVSLQGVPLSDVRVKFTDEGKQVVE  
 NILSGLKVVDSEEVQVTNVARKIAEAREGNITNEEYVVGALGYEVPEGKYFVGYLQ  
 VKSGEGETKKYVVRYEEEEQKAVIKSAPGFGSFTATVQVLGEYDDKGLPLMTPSID  
 PTEVKDEVLLCLPVIKEITLKP AVLQMDWYKILEKAEPGKVFKLAQVHAHGEDKIE  
 VIYAPTKVDALQLLVSGEEPLIPTQEDMVSTIVDPYMEELEAVVDTKIDFLKPIQEKV  
 QGNPALEILTERFLPTFLKTLGKQILRVKETIVSALMPHTQYVRTFLVGLYMSQYPD  
 GVNVTNLMARKAAYESPMYEILVSAVKTSYDMMLESLSKSTLSNIIDSIVDQYADEIAE  
 40 MVGTTTEDVKQTVEKLTGVGLKDLLTGDYVDYLIKLVALNVLTSMGSMGIL

45

<SEQ ID No.:1480;PRT;Methanopyrus kandleri>  
 VSSFANRDVISVRDFTTRKELEELLSHAEEMERVYERGGDDRLSGKILATLFFSPSTR  
 TRLSFESAMHRLGGDVISLGGKEAASTAKGENLADTVRTVEHYCDVIVLRHPKEGA  
 ARLAAELTDVPVINAGDGANQHPTQTFLDLYTIMKEKGRIGGLRIGLLGDLKYGRTV  
 HSLAYALALFGAKIHLISPEELRMPHSHILEELEQIGAEVEEHRDLEEILPDLDVLYVTRI  
 QREMFPDPEEFERVKGSYKVTRELIIEHARSDDLVLHPLPRVDEIEPDVDELQARY  
 FDQVRNGVIVRMALLDLILGGG

50

<SEQ ID No.:1481;PRT;Methanopyrus kandleri>



VIVALKVKRIEMGTVLDHLPPGTAPQIMRILDIDPTETLLVAINVESSKMGRKDILKIE  
GKILSEEEANKVALVAPNATVNIVRDYSVAEKFQVKPPERVEGFLRCPNPNCITNDE  
REPVDTV FVRESKKPLEYRCRYCERTVREDQIRELIRPS

5 <SEQ ID No.:1482;PRT;Methanopyrus kandleri>  
LSDPRFSYFRTFREVVQRKSFSAEALGITQGT VSNQIASLERFFDARLFVRTPEG  
VELTEEGEIALEAIETVLD AVERAKDKIAAVSKEPSGKVRVSTSTVPGGYLLPGSVKE  
FRSEYPKVDVIIRVCDSREATEHVLSGDADVAIVGTDAFVTRKSVEVVP IASEELVVIL  
PPDHELADAMEVSIDDIVGEPYVNRESGSGTRREVEKYLKSHGLGFEDFKIVEEVG  
10 STEAVITSVSQGAGISII SERAAKRAESAGLIRIARLEDRPRRFFYALKSDKPLHASAT  
EAFWEFLLSEFRGKS

<SEQ ID No.:1483;PRT;Methanopyrus kandleri>  
VRVLLLTGRLAADDVRKAAEDFEWA EVKVLPIDVAALMTTRFVIEQLRGEDLTRYDYI  
15 LLPGWFRGDVRKLDEALDAFRLSSREARDLPLVLRKMEEGFVPSKDV PACVLLRD  
EILRELGRKVRDVERDIPERSWIDVGPVRIARGCRPRVLSEVFADDLSPEEAASEAE  
RRAELGAEIVDLGFHERSPEDVRQIVETVRDRVGDRAVVSIDSGDPGILEAGVEAGA  
DILLNAFPDLKEPVDLADEYDVPVVLVPENKKPEIAVRQLRELVDLCERRD VDYVLD  
PVMDDPPGGIVESIVRYRAVAEEFPEAPLFFGAGNVLELIDADSPGTSALCAQLAVEL  
20 ECSIIFTPEASGKTKMSTLELAVASRMCYVAHKFGGFPKDVGLDLVVF KDKRVDSVS  
ASGLDAERFASKPQRDVRGDFVILTDHDRGV LILEHRCGDDEPLRLESDDGLELGA  
AAVSLGLLSDLRHALYLYGELARAEERLKS YGQYIQDDGIERYDRLLHDLKILEEVEE  
R

25 <SEQ ID No.:1484;PRT;Methanopyrus kandleri>  
LGLRIGWGITGAAHLLVETFKIMKEISREHRISAF LSEAGEEVVRMFGLWDDLREICP  
GGFYREVFTQSEEGASCP IIGRFALGKYDLLIVSPATANTVAKIAHGIADTLVTNAVA  
QAGKGDVPVWVPCDYEEGKIRTITPYMVL RERCEGCGICVDACPRSAIDMVDGKA  
FIRLLRCVGCCKCAEACPEDAIHGGLEYEMRVR SVDAENVRKLERIEGIEVLRHP EEI  
30 PERLGELAGEGTPDR

<SEQ ID No.:1485;PRT;Methanopyrus kandleri>  
LAEEGSELKEVIIGAPAMADTD RADTYVNDVRDSSQFFGRDARLYFGLNVNRFAGL  
ACGMVFAGVLLVPLLLAF

35 <SEQ ID No.:1486;PRT;Methanopyrus kandleri>  
VSVSPVRCEPVVDVEEPVEAEVLVSSQRLSFLGGVDPKTGEVVDPSHEL CGEKL TG  
RVLVLPGGRGSTVGSYVLMEMADRG TAPAGIVVREAEPILVVGCVLGDIPLFHRPE  
RDLVEELSTGDVVKLLPGGKVEV

40 <SEQ ID No.:1487;PRT;Methanopyrus kandleri>  
MVERSKEEALFIKALKEKFEEDPEEKHTKFYVYGGYRQSPRKEFAKGALREFEPAG  
ERDLIVPAE

45 <SEQ ID No.:1488;PRT;Methanopyrus kandleri>  
MEEPENLAVVPPSCEAGPCGNSCVFCYIRQNPPEVLREHGGNVDTTRHDTLNDPH  
LEERVERARDRYPDRLRLRIVDTAGNVGIDEGRVESLAAAGIDEVQISLHTTVPETRKK  
LMGNPNADELLELLPKFEDVGIDVIADLVLT PGYNLRELPRTCEDLETMGARQVRVF  
PVGGTDLARGFRFPTRRELEWMRETSRRLDCELNIEVIPSP TIDALLGEPAFDPPDL  
50 PEPDFAVIVVGELAAPIFEPAVRELENVELLVKNRVFGGVIGASSLLTAKDVLREIE  
RYEPRTFEFVLILPDAMFSPDGR TLDGWSREELVGKLAALGYTVVTCRKPEEVAKV  
LASPSPW

- 5 <SEQ ID No.:1489;PRT;Methanopyrus kandleri>  
 LNLRLTVLSGGTGTPKLLRGLRELEADFSVIVNTGEDDEILGLYVSPDVDTVLYTLAG  
 IVNDETWYGIKDDGFRGHEFLERLGVDEPLRIGDADRALKQYRTYLMREKGLKSE  
 AVDEIRRLGIKWKVYPMTDDRVTIVETDEGDLHFREFWVERGGKPPVRGVRYE  
 GAEEASPPPDVAVDELLRADVVLIGPSNPVTSIGPILSISEIRHIVREKPVVMVSPFIGR  
 EPVSGPAGKLMRAVGFEPSVRGLVEYYREWGVPEPDVLIMDERDDVELPEGLEVVR  
 TDTLMRDEKDSVRLAREVLRIVEELVG
- 10 <SEQ ID No.:1490;PRT;Methanopyrus kandleri>  
 MSPRLVVPAAVVVAIGLLAYWYLYPSEGASEVPIKAKIELPKPLELKMSVSEALKKR  
 RSIREYRDESITLRELATVLWAAQGIDPRGFRTAPSAGALYPLRVFVVRKVEGLA  
 PGIYVYDPKTHTLGLVRRGNFTTELQRACLDQEWVGHAADVIVGYERVLPQPRYG  
 ERSFRYMALEAGHVGNILACTALGLGTAVGAFYDDRVEILGITEGDAVPLYVF  
 15 PIGRR
- 20 <SEQ ID No.:1491;PRT;Methanopyrus kandleri>  
 VGVAVRDVRYGRLKLLVFENVYPPAEDSFLLAHQGVSGSERVLDVGTGCGIQGL  
 SAAAKGCEVVATDVNPAAVHCAWNAHLNDLNIDVRVGDLEFEPVRDERFDIVLFNP  
 PYLPGRELPGSDPISRATEDPAVIRRFKDLLREEIRWDEARIVVSSLTPKKYLEPLQ  
 RFEVEIVAEELFFEKIRVLALRPSR
- 25 <SEQ ID No.:1492;PRT;Methanopyrus kandleri>  
 LFFVVYSTAEDEEEAKRIARKLVEEDLAACVNLPWPIRSVYEWGGELCEDEEYALLVK  
 TTAERAEVVERIVELHSYETPAVLVLPVLGGFEGFLEWIREQTR
- 30 <SEQ ID No.:1493;PRT;Methanopyrus kandleri>  
 MDLEGLSLHMLEAGASEDEIRELLTDLVKIWKRDWSEDEIREFVDAVLEEVHHVRKA  
 HFLGGRVGDILRPPESGVGMGEMGVSGRGEGDFFVHELLTRLAAKASEGALVSPE  
 ERDDAGAVRIDPDEVILVSAVDGMHSRLSEFPFLAGFHATRAAMRDVLVNGARPRG  
 LLVDLHLADDGDVGRLFDFTAGVTAVGAATGVPILAGSTLRVGGDMVLGRRVLVAGV  
 ACVGTARPDELTPRRDAEPGDILVTEGAGGGTISTTAIYHGYYDVVEETLNVDFVR  
 AVEALREENLLSEVHAMTDITNGGIRGDATEISETAGVRLVFDEETVRSLVNDRLR  
 35 MLDELIDYLGSLDMLMVIAPEDVAERCVEALNGVGVRAVVGVRVEEGSGVVLER  
 DGEEVELDVKFRETAYTKVKRVIGEEHPEEFEEEMKERVRRAYEEAERKLRWVLERL  
 GE
- 40 <SEQ ID No.:1494;PRT;Methanopyrus kandleri>  
 VSGAELIRELIMELRALRHEIHMLRVELEKLRSEVNEVEPDDDFSELLPQSEHVPEVV  
 IEDSGLGPDVAGERWRL
- 45 <SEQ ID No.:1495;PRT;Methanopyrus kandleri>  
 LPYVPLFVRVERAVIVGGGRVAERKARTLVDLGVDVIVVAPEESEWIRDLVPRFVRR  
 KVKGPEDLPEADLYVATDDPDNLARLERSLVNRVDTPRPKVRFPSVLRSGDAV  
 LAISTGKPRVTKALRMIAAELLGPTLRKAAELSEDARKWVSLERVINELEGLRWQDQ
- 50 <SEQ ID No.:1496;PRT;Methanopyrus kandleri>  
 LTVYVDATDILDPRWLFMGDPDRIYVVRTGHAPMHLHFELKRLVGFRVSVDGNAITG  
 TVTPEGCLSSCTIPWVAQIVDARPGDDVLVGGPEDGIDRVFELFPDVEEVEPEEP  
 EPIREPHSNAVMPNRKCKAARKYDTTELKEILKKAGFEIVPSVERYVCGFEAMQRT  
 ILRGDARIGIAASFDLVSGEYLGILIPVDVHGVTGTPRLNPELRVKTKDAPELLRNLLR  
 MSPEHRREVYQQRLLLEPNWDRKFPNA

- 5 <SEQ ID No.:1497;PRT;Methanopyrus kandleri>  
LEPVSFRRGEVKTVIDVGVGTTDVVAYTGDPEYSPRFVGPSRVSTLAQRLRFMLRE  
PPRYLALIGVPMGGGPTTREFKRLMKKGTEIYAELDAALTLHNDVRRLEEMPRLHIV  
EDPIEEVPPDSPVVETYDFRVSDVFEALQRSNVMDMGVETVVACVQDHGYHPDYE  
SNRKHRFERLFRRYLGANGCRPDRMTFDDVPPESFPRLRAAYMEAESAGVDAVA  
MDSKVPIAMLGRVDSADRLVIDYGTGHVTAFLFDGDRIVGVYEHHTIRLSSEKFE  
RQIREFVEGKLENEVDYRDGGHGHCHNVSPMDWDELEDIVSLGPKKPEFQLGRDPE  
RFPDRMMPAYGPAVYLTDRGE
- 10 <SEQ ID No.:1498;PRT;Methanopyrus kandleri>  
VKVVLKAGTGAVKEVDAVKNAITAFEGELLVPPGGWRFANIVREVYEDGDLSDDA  
HWMIAAAMDQGTGYLLSLLDLPTEEPEFGGKLVLLPYRYLRMKDPLPHSWEITSD  
AISVYVAAEANANLVVFAKDVPGILEDPPDPSSLIREIDARELEGNWTALDPVAPRLA  
15 EEYDLELRVYAGNPDNLLRAMRGEEFVGTRVVP
- 20 <SEQ ID No.:1499;PRT;Methanopyrus kandleri>  
MIGPLDPLRDYLRRELLGEGFVLVGLGNPLAADDGFGHWVARRLSPLKTHKFKAVAA  
GVWLERLRPNPVLVDTVRVDREPGTLVVVKEPRLGPDRGSHGPPDELMDVR  
LLIGFVPVKSGFGPMSPEAKSVADAVVRVVRDVVLEGTEGPTDRGLRGSAAHHRER  
QKSAQTTRGSRPL
- 25 <SEQ ID No.:1500;PRT;Methanopyrus kandleri>  
VILQRSDSYSDGTVLGSMCTEPHPVAAAEAFVAGLHVNLGDPYLPNAYRAERECIG  
WLAETLLDHPAPEEAEGSIVSGGTEANILAAAYAAREVTGGREIIVPATRHSFEKAAR  
MLRMKLVEAPLRSDYTVDDAVQDLISRDALIVGIVGTTETGSVDDIEALSDDVAEDH  
GVPLHVDAAFGGFTAPFLREEYPLPRFGFDLEAVVSVTVDPHKMGLVPPPAGGIVF  
RDDEFPKAIEVYAPYLSGGGASQYTITGTRPGAPVLALYANILELGEEGYRRIAFRCY  
EETLKVAEKARELGLELAVDPPHLNLVNIRLPDRGTAERLLRESEREGWKISVSTKP  
30 LGVRIVMMPHLDAETVSRFLELVARVLGG
- 35 <SEQ ID No.:1501;PRT;Methanopyrus kandleri>  
MEEGPIRVPNELKDRRELMKSLILAFIGLRQPRVHLGDIGGELGVSLQAIHNYVKELI  
DEGLVEKKGRAEYVLTDKGAEKALASINNIRRFSAKIAEALGKRMTWAAIAAEDIRKG  
EEIYLYMEDGLLYASKSRKTGARAIQAADAEGQDLPVTNIEGDIPGLERGEVVFVC  
VPSAREGGTRKLDLDRLEKEVLEKEDYDLIGAAGTAARAALNMLGIEPDLKFGVVDDGA  
MAALKGLKALVVITTPMLRRARDKAERRGAERYRIQYV
- 40 <SEQ ID No.:1502;PRT;Methanopyrus kandleri>  
VNKGEDNLVRTSITVPEQLLQKVNELIASGYFASRSEIFRQALREYLQRIEWTERVG  
DEEYFGALTYVFQHERAEPELVKVQHEFTDVIISTTHIHVSPEKCLEVLLQGPGKRI  
AELAKRIRGVRGVEQAKLTVVSSEGE
- 45 <SEQ ID No.:1503;PRT;Methanopyrus kandleri>  
MKVRVGTTPVVKVRATERAFLRTFPDREITVEAVSVDPGVPPQPVGMEEVHQGAK  
NRAREAWNRRGSYSVGLAELIRVGDVYDLHVAVVRDPKGRETVGTSPGFQLPPD  
VTEEALSGEEVGEVSELVGVREIGKRSGAIGVLSNGKVLREDLCELAILMALIGLET  
SR
- 50 <SEQ ID No.:1504;PRT;Methanopyrus kandleri>

LTPLARFRKVVGGTFDRLHLGHQRLLSVALELGDRVVIGVTTDSFVREEGKKGVE  
PFEERVAVRRFVEEKGASDRVEIVPLEDRYGTTLLEDDMDAIVVSPETEPVALEIN  
ELRRKRGFPPLSIVVIPFVLDGDGRKISSSRLRGEVDEGPCRDD

5 <SEQ ID No.:1505;PRT;Methanopyrus kandleri>  
VVVQAWTDLKVRLLRLDASREILERYSRQPELEGVLRGIEIEKARLHGELPWDYW  
ERWEGEPRDMRITVAASGGYDSTASAILRKLGYEESVTVDPGPMFLPPKLRRN  
VEILSEYLGTEPKFVEEDLSDVVEGALNEGRFHPCGRCNAKIRKRVMGeadtdvva  
10 FGDGLPTGHHCVPEDDRFKLHVPAALAKTKFELRRLVEEVLPFHDYKYACPFLH  
QVHQRHPLRRASIQRVLRHLRGFLVGEALKAVYDILGG

<SEQ ID No.:1506;PRT;Methanopyrus kandleri>  
LKA VINRSKGTVLAHSAEIAESFLARLRGLMFRRLLEEGLILKPPYRGRRRCAIH  
15 TFFMRFPIDVFLADGEVVDVVERLKPWRVYVPEEPPEEIVLPAGIVSATDTEVGD  
SVEVWAGDLESELAVRILNRKLVTRKLAQVIMRAVAKSGLQGEVFYKDTGCIHISG  
EDKYIVADTIKETFGDSVEIVEGRAKILSDDHSLVIVKDAHSVLEKIGISRPGGELMY  
RKEPKPVRWVGKQREKGADDGSEQAEEDRNEGEGRTRHRGRT

<SEQ ID No.:1507;PRT;Methanopyrus kandleri>  
20 LNFVETFRRLRCLQPSAVVDFDPPAESLRSTPVIKLP SGILHSVGPVEACASLGLK  
EGEPVLIASYSRCSLEFRPIRPEEARLAALDHYRVVSRILETMVELAVEGVEGDRVG  
TLCVISEGADRM YRTTVPVRVEDVNVM TGSGKRVLKALAKLDGAI VVDPEGNIEAA  
GAIFD VDSGSVEPGFGARHTTALHVSKE LNCPVIVLSESGRIRLYHGGKEVLKISVSD  
LVAIRGFCDG

25 <SEQ ID No.:1508;PRT;Methanopyrus kandleri>  
MVRNIVVETMKRSPFTETETEVEIVERKGVGHPDSLADGIAESVSRALCREYIERFGRIL  
HHNTDEVQIVAGESRPEFGGGEVIRPIYILVTGRATAYVGDEEIPVGTIALEAATEYLE  
ETVRHLDTEKHVVIEPKIGHGSADLRDVFERGEVPLANDTSFGVGYAPLT TTERLV  
30 YETERKINSPKLKDLPEVGEDVKVMALREDNKIELTVAAAMVSQRIDDIDHYISVVE  
ELRDRVADLAAEIASDHDVEVHVNTADDYERESVYLTVTGTSAEQGDDGSGVGRGN  
RVNGLITPFRPMSMEAAAGKNPVNHVGKLYNVLAHQMAREIYEETSADEVYVRLLS  
QIGHPIDDPKAVDVHLVGDVSEEDERVARRVADELLENITELTERIVEGEIEVF

35 <SEQ ID No.:1509;PRT;Methanopyrus kandleri>  
VRVLSEYKKGAGELLREHGLSVGDRVIRVDDGVVVEGIIMPRSELGDDEHIVVKM  
DNGYNVGVVRVDRIEKLEAPGEGHEPSFKPMEGEIEYDPKLPNV SVMSTGGTIACRV  
DYETGAVKPAFTAEE LVGAVPELLDVINIVDARAVLDLLSENMEPKHWMKIAEEVVD  
ALSDPDVEGVVIGHGTD TMAFTAAALSFVIEGLNGPVVLVGAQRSSDRPSSDAASN  
40 LIAACAFAGDGEVGEVTVCMHGWTSDEVCLVHRGVRVRKMHTSRRDAFRSVESIP  
AKVDVKDLRNP KIEFLRSDYRRPEDGEPEISGGFEEKVALVKFAPGMDPEVLD FYV  
DRGYRGIVLEGTGLGHVSEQWLESIERAVDDGIAVVM TSQCLYGRVNMNVYRTGR  
LLRAVGVIPGEDMLPEVAYVKLMYVLDRTDDIKEVERLMRTNIAGEIEGGRVLGGFE  
PADGPHHRL

45 <SEQ ID No.:1510;PRT;Methanopyrus kandleri>  
LKVAIVEYGVGNLNSVYRAVKHLGHEPVVTD DPSELHDADAVILPGVGNFRAAAEKL  
EETGLCDEIRELLGSVPLL GICLGMQLLMESSEESPE SRGLGVFRGTCVALPNDVKT  
PHMGWNTVEFRTEEFREFD GEMFYFVHSYRVAPEDDVVLGETEYGERFPSVIGDR  
50 GRLIYGMQFHPEKSGPVGLKLLGEVLTGASR

<SEQ ID No.:1511;PRT;Methanopyrus kandleri>

LRMSRERIFREVKESLKNIQEVRSELGDNVSLSTLRYILASMVITLGRGVGSTFYRAG  
YDIGVYKAKSHDLKGIEEAFEYVEKAFERTGTGIIERWEMKEDGKIEITMRESATAAG  
YDIGKKLCYYQAGFIAGILHGATGERWEVHETKCMAGHDHCEFVAIRRG

5 <SEQ ID No.:1512;PRT;Methanopyrus kandleri>  
VERVVHGTLMDFGVGVLLVGPRGVGKSETALELIRRGHRLVSDDAVIVECDDSY  
EYPVGRPPENLAGKMEIRLALAELYCPECGRVYTFSALKMKEGCDGGLKLRPIQ  
DKIAVDVAELYGIRALRSRKIGGVVIMIPGPHHPHDPMPDEPVSSTPSEEEKV  
VKWVKERDGRVFHLDVVPGRDTATLIETVALQESLRRRR

10 <SEQ ID No.:1513;PRT;Methanopyrus kandleri>  
VVLSDPDLGAALLLSLDELHTGLVWGALRSQYLLLGAYLRVRHSALFWVLVHETL  
EFLFHTVILSLIPVPMVAASVHFGIDLFHEALLGTVKGRVTHRLMHLSLESAILYW  
LWG

15 <SEQ ID No.:1514;PRT;Methanopyrus kandleri>  
VRILRDLIGKPVIDSSAKHIGEVLDVEFDEESGEVTTLVGHSKRPGVLRKIKWLGGE  
EKAVRIPYSNVVAIEDMVLVEGRWVSRED

20 <SEQ ID No.:1515;PRT;Methanopyrus kandleri>  
VLEPETFDVDPDIRPMSGHHDELVAVLKALGDERRIAALEILGHSEECCLKLAELGE  
NQPSTAYHLKKLLEVGLVTKRSEGGRTFYRLTERGERVLKVIRDLKDQLRRT

25 <SEQ ID No.:1516;PRT;Methanopyrus kandleri>  
MPLDPLLAAYLAVALDLVLGDPPNRFHPVAWCGRVMELVEKRVRRGRVLDVWVG  
GLTLAVGCGFLLGVCYPLHYIPMVGDALVLWVCISVRGLVEHLLPVERELREGNLDG  
ARQAVRWLVSRDVSRLNGAEVASAAVESCFENLLDSVVGPLWWYYLLGWPGAVM  
YRATNVADAMFGYRGEYEMFGKIPARLDDLLNVLSLPVCAAALTVTLPWWILRARL  
RSLRAARDVPSPSSWLPMPYVGACALGVRLEKPNVYVLKGGDRLPTDDVRRAAQ  
30 IAVIFGLVAPGITYVAAGLLSP

<SEQ ID No.:1517;PRT;Methanopyrus kandleri>  
MTRCTSAESYDEDEVPRVVESLNVGRVLVQAPDGLKRIAREVADVLEARGCEVEL  
DAGRFGACDITPGTVVRTDHIVHIGHYPIPEVERQIRELGATVHFLPTHGRKRVEP  
35 WMAEEAVEVLHNLGIDRVNVCATAQYVADLELVSEILRESGIEPVIRPGDGRRVATP  
GLVLGCNFSALDTSLPTIVCSGSFHPAGVAIRTNRPVVQIDPTKGVLDSEDEDVIR  
RILAVRLSKIREFNREEGFESTALGQRRPDVVRVLD RPTWRLRYLTEDALRSR  
RRQCVFCGCPRPVDEAARFKRWVLLNPAELAAVRAGWKEYRLDEIPTPEDVLNA  
LRR

40 <SEQ ID No.:1518;PRT;Methanopyrus kandleri>  
LYALGVGMRRRVRRQDLVTAVRWGLEEAGELGEIITITRKRDQPSGKALVEIGRRF  
GIPVRFVEKLADHTPSDSRARDLLGAPGSVCEGLITHGYEIVRPKRTFGNTVTAAL  
GWKRSRK

45 <SEQ ID No.:1519;PRT;Methanopyrus kandleri>  
VARVLSEAIKRSRGTGVLMLPQSTGGSGRKWVGGRWDCDVVATVDRVSECD  
YALILSRFGACTNARKAVYDLSSHQSFGFEPPEGWVGIDCFRVARDKRVPVHALIL  
LGAMCRIARLCELEDVKKALLSEEGRLGAVSYRAVRAGWEEAGRWC

50 <SEQ ID No.:1520;PRT;Methanopyrus kandleri>

5 LKPKVVDLFCGAGGFSRGFKEAGFKILGGVENNPAPAAATYRENFPEAEVIERDIQVR  
DSEEIVDELGEPDVIIIGPPCEPFTAANAERKPNPLDRLYDDPVGRLVLHFVRIIGDL  
QPEVFMENVPIMEGPLEKALRKEFARAGYDEIHFNVLQAVHYGVPSYRRRVFIS  
NVRIDPEPTVERPKTVWDAIGDLPSDSEVPNHRLRPLSKRKLRRIRRLRWGEALS  
IRGARGSFKNWLRRLHPFKPAPTVMGGSRFIHPFEDRLLTVREQARLMSYPDDHVFE  
GGYETQYDQVGESVPPELARVIAEEVRDHLA

10 <SEQ ID No.:1521;PRT;Methanopyrus kandleri>  
VRKVPIAIGILAVVVIAAAAGYYTSSNQLTVFAAASLKKPLTKLAKQYEKEKGVKVAL  
NFGPSGGLTAQILQGQKCDLFFSADWKYVVKLQKAGKTAKTCKFLKDYLVLVVS  
GEKKGIKSVKDITKPGVTAVADPKAPVGEYTQRALEKLGWDKIVKGNLKARPGT  
VNQVATMVKNDQIDAGFVYRSVAVGFGPLIVQMFPHSLTGPIIWGA AVIKGGNEQLA  
EDFLNYCLEHIDEFKKYGWSPA

15 <SEQ ID No.:1522;PRT;Methanopyrus kandleri>  
MIGRYEILSTLFPPLFFIFIVFPLVALVLNLTPQGIAEFSDPYFWSATFNTILCAVAAA  
AAGVIIAIGFGYYHLFKRDSVIYRVADFLNDLPALPHTVAGLALLAFGRNYFGWLGE  
NGLAFTLIAVVLAMLFVSYPLAARAVQAGVEELGRELVAVARTLGDEPPKAYVRVVV  
PALQEALLGGFLLGFSRSLSEFAAVIMFGGNLPGRTQVLASYVFTRAESGDLEVAVA  
20 ASVFCMVLSTLMVALVRSVTGGLRRAEG

25 <SEQ ID No.:1523;PRT;Methanopyrus kandleri>  
VLRVEGVKFSYGDREVLRGVDLEVEPGEVRVLFPGPNGSGKSTLLKIVAGILRPDEG  
RVIIGEEDVTDLPEERHVGYPQQPALFPHMTVEDNITYSLQNGRGDPDRDELV  
ELLGLKEHLDRKPDELSGGYQSRVSLARALFSDPKVMLLDEPLSDVDLAVKAGLVP  
RFREVLKETGIPALYVTHDPWEAERIGDSFTVLIGGKAVDVNSVDEALEELKRGVES  
VKA

30 <SEQ ID No.:1524;PRT;Methanopyrus kandleri>  
VSKRKYRGFVYTDDLAKPEEFIRFLRRFLSPPEPETVEVGPELSGRVLAEDVRAERP  
SPPFTRSAMDGYAVRSEDAEPGARLKVVGESRIGEGTDVKVGPGEAVYVDTGAPV  
PEGADAVIPVEFVERDGDDEIIEEGVDPGDNLDPAGCYVEEGEVLYRSGHLVEPVD  
VGVMLEHGVVEVDVHRPLRVSVVTGNELVHRPSELESETQVVCIGPVLTALEN  
MGCVEVVGTSVLKDDPGEIRETVEDYADRSDVVLITGGSSVGERDHVKDILDDTFD  
35 AFIHGIRARPGRPFGIAAREGTVAFTLPGWPTSCYSTFRVWVPSLLVLGADPLVV  
GFETEATGIKSKREVGVIARVRLTSDGAEGLSRDRSSHFAFRETDFGALVPPGGS  
ERALILPLRGFLNLFDEVERKF

40 <SEQ ID No.:1525;PRT;Methanopyrus kandleri>  
LVKIVIHEERCHGCGNCVIACPVNACNSPNVWGGKGPEDGEDVVIKVVNGTVSVIN  
EDLCEACMTCELACPVDAIEIKT

45 <SEQ ID No.:1526;PRT;Methanopyrus kandleri>  
MAEFTLLTGRTIWQGEAIETDKAGEIYPNATAICYFNPKDMSELGISEGDPVKVSKY  
GEVIVRAKAADTDVPPRGIVFIPMGWANKVVDPNKSTGMPGFKGIKVEIEPTDEE  
PIEDMSEFMRSEYLSE

50 <SEQ ID No.:1527;PRT;Methanopyrus kandleri>  
VARKVIKDVVCPFCGTLCDDELVVVEDGEIVEVRHACRIGAAKFLTAQEDHRHTEPM  
IKENGEWKIDYEDAAEETAKMLVEAKLPVLYGWSATLVEAQEKGVLAELVGGIID  
NTASVUHGPSVLGLQDVGVPSTLGEVKNRADTVIYWGSNPMHAHPRHMSRYTAF  
TRGFFRPKGREDRTIIVDPKRTATARLADVIRVRPNEDYELISALRAAVHGIEIERE

EVAGVPTEQIYEVADLIKEASFGLFWAMGLTMSRGRHRNIDNAICLIKDLNEYTKW  
TLIMMRGHYNVTGFNEVLAWTTGYPYAVDFSRGYPRYNPGETSTVDLLTRGEVDA  
MMVIASDPGAHFPRKAVEHMARIPLVCVDPHWTPTAELADLYVPVTIAGIEWEGTAY  
RMDSVPIRMKVVEPPESMLNDVEFLEMVIEKVEEM

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<SEQ ID No.:1528;PRT;Methanopyrus kandleri>  
MELRCPYCGSRSCVNESALSFLRASERAARYVVKGRDDVDEDPNFRPSFGEVGI  
CKETSKRIWVCPYCHSLIPELPGMTARCEPCGREANVAPSRRKIVC

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<SEQ ID No.:1529;PRT;Methanopyrus kandleri>  
LAKELLIKNACVYDPLNGIEGEVMDIGVKDGKIVDPSEVDESKAKVIDAEGRLTMAG  
GVDIHAHVAGPKVNVGRIFRPEDSRRLQVAIKKLGTRSGTGFSVPSTTITGYLYAQM  
GYTTVMEAATPPLLTRHTHEEIRDTPILDEGAYTLMANNWILYEYIKEGELEKAAAYA  
AWLLRATKGFVIKMNPPGGTEAWGWGENVHSLDDPVYFEITPAEIYQNYVKINEM  
15 LGLPHSIHIHPNLLGEPGNYEITDSDWDVIKKTGVEPNPEIGEREQVHNTHVQFHS  
YGGDSWPTFESKAEVAKYLNKNDHVTVDLGAVTLDETTTMTADGPLEWELQELT  
GFKWANYDVELETGSGVVPFIYSPKNPVHVSQWAIGLEIALLTENPWQVWISTDHPN  
AGPFIRYPRIAWLMSEPYREEWIENVHPWVGQRAAIATIDREYTWTDITITRAAPA  
KMLGLSDRIGHLGEGAYAHIAIYDIKPDEVDPSTRDYEEVEKAMEQAWLVVKDGEIVV  
20 QEGVVVNEPVGRTYWVDVKVPEDLLEEVKKDLETKFRRYYSVNLGNYQVQDVYIP  
KEERIVIDARDRLS

25

<SEQ ID No.:1530;PRT;Methanopyrus kandleri>  
LKEVVLTPKGEPDVPLEAEVICPDEFAGKSEGEIEALKIYEGNSTVELGEYFDVEGDA  
GDSPGDTRIVIEGDVPWVKLIGYRMSAGEILVKGDVGRHAGAEMKGGKLIVEGDAD  
DWLGREMKGGEITVHGNAGNYVGSTYRGEWRGMSGGRILVKGDAGDEIGEWMS  
DGKIIVEGDAGIMIGIHMQGGTIIVRGDVGVRPGAQMEGGTVVVCGRAEDILPSFRY  
EGLKEDPVEEATGTFHLFTGDYANGPKVEGELYLSTALNEVPR

30

<SEQ ID No.:1531;PRT;Methanopyrus kandleri>  
VKTLRMSPEELLEYFRKEVEEGDRLELNIAFVHIPGEVVKITRYRLHLYVESEVAPGI  
RRYDLEEICSMMLLEVIHEPKEGKPKIVVEGADESPGIGIL

35

<SEQ ID No.:1532;PRT;Methanopyrus kandleri>  
LTRTAYVLLALLAALVGQASAASVGSQTLTDTAMQWDQQQNKYVDSDDVAARDGY  
YQVKGPAVAVDSTGTVLVAWEEWSENGNVVGKIGLRTPSGNAVYVTEQDCVYFA  
PALTSYDQKGKFLAVTEVPQSNLVAQDYGKLLVYKVDVSNGQITVGSSPVQVADNA  
AYPHVVYLGSDNDNRYVAIVYERWNGETGDVELQVLKIDTNGNIIPVLSQPLVIAEG  
VCKDYVKGDVHYFGHARPVASLYQEGDSKYLVVLTNYSQATPNVSEWGFYGEWK  
40 GCKVEAYVVDLPDFSTIGGLSSENVHKVQGSLSASEDTNECPWVCDNVVVYRVGS  
LWGGMSGDTTIPDINAALIVKSRDSWTFSSDTTIYRRIYTQTGPAVARVYTNNDDKT  
PYYLAVFADNSGGFGKERLTGVLFRVKDGKIQVIAQYDLTGFGSGYCYCPTVATV  
KSKYGDAELVVACYKGDSGSGGHNIGDAVMLTVSIGDPVDEFMSSAAELLNSLTGT  
VDVVNNAIFNSYSGLKKKVSLEKKSNELTQTTQELQNKVSTLEQGQEELKQEVSKI  
45 SQUEVSGLKGSIDECKNTVENLEERVKKLERRKIAVSPMAVLAAALTAAAYRRYGRQ

50

<SEQ ID No.:1533;PRT;Methanopyrus kandleri>  
VPRRCRPPSRRYGLNFYFLHLPYVVGSLRSGSSRLKVWGSEVRVLVATIAVLITAA  
PTTALDWKNTEPYKELQTECAVAKAGTVWWFITDRGGPYLASAHLWNPQLTFG  
YELKAISLVYPTLESAERAGLLADRVPAAGVPAMTPTSEWSKASEEAVRWVLDNQNE  
DGGWGQAWTYRGITHSGSLTSDTAVAIMLLIHEIERRHESGGEYSELVSAVRRGLT  
WLLDQQLDGGWSRKREEAREGAPWHTRAABAALLMALERRDLLNLDSDAVDRIK



SAIERGVSWLLERQNPDGSWYSGLMCQEYSADTQAYILSTLIDVYLKADRLGLHVD  
RDRILNAIRRGIEWLFGNGEEAGVTWVEGSHGRGPAWAYSSAYLEAQGSPETT VTG  
NVLSLVLLKALWFDVATDVEIETPGGKRKLSDLVTDPEYNLHATVEWLVSQRYRGT  
EHPEWYGAWPWPARDVTSTTEGAHYEPASIWATAYAMRALEAYLNPELFYGKITK  
5 PNGNESVSKTERETVSGGTETEGNKRQEKS KRGVPVLLPAVPPVRRQRQRGGQY  
RHR

<SEQ ID No.:1534;PRT;Methanopyrus kandleri>  
MGADTSVAPVLILVMVFLAVSVPAHSLDIVIFGNAAKGSPEEIRAVEERVKEDLGVDV  
10 RIHVHNVLVSWSDQSAPVDFDSLADIERSEIVALDNMGPMPTPFAMELSERVLGK  
PASSMQEFLRELAERKRIVAYVTGDQHDVFILGSGCRRIVDGTAAVVNLGFLFRFSS  
DLTPVIEFLVWLADPSVPAERLHLSDVRISSAAVYVPGRGWEFPEVSGEALMSYH  
RWLHALEGRDRTTEPLWTKVRLSSIPSWVKAIREASSQFFRSLWLPNRRVVVLDY  
IDALYKGERDLVEKLTDTVYREVSREFQDVTIAVLC DGNMVSPIEALLGLKDAGYDI  
15 AAVVSLWAFTLDYPKPGTWALEGIDAPIIKAVYPPFWANWMDEPQRYLNMNEGDPE  
SGRVGALFEWGYQVIGGPEPEGAFWFKMIALKERDQMMVFPLEDMIEDVARMVAG  
FLRLRYLPESEKRVAFVLYCYPGRGEIGASYLDVFRSLVRIFEALAERGYDLGPAT  
SLYRKLAELRREDPKAAEEMEKRLAHALMAASDLVLKNVGPWAKGELAGMVRLYR  
GGRAEVSVDWNGKSMKVIWDHGVLRWIDVDGSSYVLGTVSEDQLVPVEALERWY  
20 REDVVRREFEYLSLLTGDDPETERARKSLMEWMRAIEEKFGPPTDNRGIMRYGLYY  
VIPALRLGNVVVMLQPVRGWSGSELYHSPDLPPQWQYVAAYEWLRRVFRADAV  
VHVGTHTGLEWLPGHQVGLLGVDPHVLLPDVPHVYLYIVSNPGEAMVAKYRSGP  
ILLTHLSPPWGYFKDLGKYGELERELTRYFQMKSFGGDPHVLEELRRRIVETAERLG  
LLKDVNMIFAERKEPPPENPKEWAMDHIEEFIDKLHDFLLDLALRNVAAYGLHVYGE  
25 DVDEDVAVEQAAALASSRVAPVFAYYAGLIDSPDQEALNRLQSDRPDIFAWFKREL  
RECLRDILRTVLKYPDLTSQLERYVELKDREEYYGEPDGVGPGREAKRLFWQVS  
DRLTILAQEAILRYFHGRRNDPDHEHLLAEAVADLYRIYVHYRDSGRTELEELLAALD  
GRFVPPGLLGEPMWNTKVLPTGRDGYPIDPSQMPTPEAWDVARKLVDQMLADYYL  
RHGRWPEAVGVVLWGIHELCTGGLGIAEVLYLLGVRPWWNPDTGQVTGVELIPLDE  
30 LKVKVGNRWINRPRIDVVVWAALHMEDPLKLLTEAYYLVSHVDEPTDVNYRRKHYL  
ELKPRLVKELEKSGMSPEDAKEADVIASSGFFAQPPGVYAGTGACDIVEHAWTDV  
SGTVGLFEDPETALKNFEQRFWEKFRITCESRMAYVYTAEARILTIREGNKVRVVL  
RTSTDRVYHAIPSVEAFRYLMSKVDVVHVS VNTWGLIDTDDFYDWVGGMALYAT  
HAAGHAPEVYIGNAVDPTAARTLTGYQQLVGEVYTKLLSESWWKAMLEHGDYGW  
35 SRIVRRIEFLAGWGITVPSLRPYLNSVYTEVFKAVVQWISQAPPRTEYGWAAVVSTI  
AWFVELARTGWVKPDSKTLAQAAKVLLTMAKHGPATCHHTSPNPALVVYAARVLL  
EAGYSYSEVKRLLSKVMKWYAKLDNPEIVREIERLTNLVMTRAASERSARAATASR  
SAATSSSAYTGVTVSRTVSSFTGPGLPGGRGSAQVVVGLLGSVLRGVARGTVLPEI  
GYWTGPSRYTGHAKAGSRVGKTERSTERESKATQTFTRTSPSSAPKMIWEWVA  
40 ALLLTLLFLLVWRIRPTGPRPRATWVTPATVPPVAA

<SEQ ID No.:1535;PRT;Methanopyrus kandleri>  
LEVHKFGGTSVASEEGLRTLASAASGHVIVVSALAGVTDALDFVRRAAEGSADP  
45 TPILERHREFITEHLEQRHEEVESFLKDMETLLHGVATVLEQLGRPEERLRDLVLSLG  
ERASARIVAAYLKERGKAMAYDAWDVGLVTTDDPGNADIVGWDGTRSRLRLDLRS  
GRVPVVTGFIGRSDRGHVTTLGRGGSDYTATVLAGVLGSRSVIWDVDGIMTTDPE  
LADAEVVERLSYEEAMMAGASGAGVIHPKAVEAAKNLGVTVLIGNSFTGEIGTVISD  
STEPGPKVVASRDDVALIRVSGAKMVDEPGVVGRVTSALGNAGVNLAVFTTVSEP  
YINLLVEETALRSAAEALNGLDYDWEVDKDVGLVTVVGEGMSARDVSTFLAACEGF  
50 DLLGSAHGVA VSVVPESEVREVTRRLAERLLA

<SEQ ID No.:1536;PRT;Methanopyrus kandleri>

5 VNATRGEGVGSMDVEIETEVVVPDTSVVIDGRISRLAEEGYLEGKIVVIPRAVLSELE  
YQANRGRETGFAGLQELQELQRLAEEGIIIEIFAGERPGLEEIRLARSGEIDAMIREV  
AREYNATLITSDKVQAEVAKAEGLEVVFEPITRVGETEIERMMPENAMSLHLKENV  
PPKAKVGRPGEWKLIELRPEPCTREELEKWAREVIEKAYTDEKSFVEIDRGGATVV  
10 QLRNLRISIRPPFSEGWEITAVRPVVKVSLDDYDLSEKLKERLRERAEGLVAGPPG  
SGKSTFCAALAEFYAEQKIVKTMESPRDLQVGDEITQYAPLDGDMECTADILLVR  
PDYTIYDEVKTKDFEVFADMRLAGVGMIGVVHATRPIDAIQRLIGRVELGVIPQVVD  
TVIFIEDGEIKKVVYDVSLTVKVPTGMTEDLARPVVEIRDFETGELEYEITYGEEVFV  
VPVKGEEEQETASERLAAEVVEREVRFRIGGRAPVDVEVKGSQATVYVPEHMPM  
15 VIGKKGRNVEQIEHRTGLKITVCKPLEERRGERPQPAGSPVPEGEGEVIEVESGERFP  
MRVDDGEYIRLQLGDKFSGRPVKVFGDEYVFTATVGSSGEVRVNKDTSVGQRL  
EEALHKGLKVRAQTIP

15 <SEQ ID No.:1537;PRT;Methanopyrus kandleri>  
MSHVPLDPETARKVTSSLNRYFEIGGEPLVIAIAQDAENGDLMTAFANEEAVYRTL  
TTGYAHYWSTSRREVWKKGEESGHVQRVVEVRVDCDKDAVLVVEQEGGACHT  
GYRSCFYRRVTRDGSFEVVM DRVFNPDDEVYR

20 <SEQ ID No.:1538;PRT;Methanopyrus kandleri>  
MGVTLMKVERPKGTRDFTPEEMRARRWLERYLLDVFRSYGYEEVLTPTFEHAKLF  
EEKSGEEILEEMYVFKDKKGRKLALRPMTAPVVRFYNAELKTRPHPLKLAYIVNCF  
RYEQPQRGRWREFWQAGVEVFGSDRPEADVEVIELTYRIFDGILPSGAFEV RVGHL  
GILRGLLEEY GIGEDVQNKVAHLVDKGELDEVKTLLPAEPAEKALAVVTARSESEVE  
EAVSGKERAERALENLMEISDALREAGVDHELDFSVARGLDYYTGMVFEIHVPELG  
25 GGSQCAGGGRYDDL VKELGGPDVPAVGMAIGFDRLLLAELYDRIPDGVETTRALL  
IPLVRSGKIWEIAAKLRKLGWVVNVEVSGKHIRKALSLADSLEYDYAVIVGERELKEG  
YVSVKNLKTGVQEEVPLDQLERAAEV

30 <SEQ ID No.:1539;PRT;Methanopyrus kandleri>  
VTSRDAKTYEEAVEIVLRTL VKAERIKPTQYARRLVMKEMNPSREARSVSAGLLYSV  
LQKRGLLDEVIEDVLEITDDVTEDTWVRNAARIAVNEVVFEDGDPDEVADVLHGLV  
RRLANPGAAAIVKAFTLDLKDYEPEPEDELDRLKWEYYHPRWLIERWMEMFGDP  
DEVVALLEANNRRPPLTIRVNTLKVDPPEELAERLQRKYRVTVPEGRFLDEILKIPEGL  
PIGEMPEWEEGLFVIQDEAAALASAVLNPKPGEVVVDLCAAPGGKTTHMAQLMGG  
35 EGKIVADVDDEV RMERLREIAERMGVLD CIETHLMDGREAPEKLGREFADAVLDVPP  
CSADGTIPKNPERRWRITPDELERLPKFQYELLKAGAEMVKPGGRLLYSTC SMFPE  
EDEEVVRRFLDEHPEFELLEVKVG DQGDFDMPEACRLFPHRHETCGFFIALMGR TG

40 <SEQ ID No.:1540;PRT;Methanopyrus kandleri>  
LRDALGREVRSVRISVTMR CNMACVYCHREGERPGRSELSAAEWGRLLRACAEIG  
VRKVKITGGEP LLRRDLIEIIENAEGFEEVSLVTNGVLLADYAGDLAEAGLDRVNVSL  
DTVDRKLYRKLTRSRFSPDDVIRGIEAAVSEGLTPVKVNVVLTSETVKTLP TLVEELA  
DLEGLKLQLEPMGSIPGFRPAHAEDGLRALGEYEPELERVRTFHSREYRLNNGM  
AVEVVKPMDGVMCEACTRIRLTHDGKYKGCLMAPPKPLPRDDFGELVRTLKEYVR  
45 TRDDT FEVHQGTSVMGRMRGDVSGR

50 <SEQ ID No.:1541;PRT;Methanopyrus kandleri>  
MSAYSLPWYSVWAHPFIAGKAIEEYGAVAGLPAVFLGIVPSAERWVRGDYKVEYG  
WIVANYQGPVVLIRGSHLYVKKPGLVWGRKVPKVAVKVGSDIEVEGKRMTFE  
EAAKKYGWEKLYLKKADVGERATLVYELKFTDGRRPMDENEVKKVFGEAA YRRM  
VEMADYSAVVWIGKYRKKLIGHAETTM EGIGHLDNLRVVAARMCRGWNGVIVPP

HTWTHGKRQYFDVFEVPGYEKAAHGCCPPARALRDACLDAGLPKPKGIDMGVHP  
MEYGFHPTEGVVYNTKPYPIILIEIGFKGKPKIGGIIFCNIYALLPA

5 <SEQ ID No.:1542;PRT;Methanopyrus kandleri>  
MRITWLGHAAFEVEIDGVNVLIDPFLSGNPKAAKSPDEVDPDVLVTHGHGDHLGD  
AVEICKRTGATLVGIYEIAVYAQQGGVENVEEMNIGGTIEVEGLEITQVPAWHSSEIV  
EDGEIVAGGTPVGYVVSGEESVYHAGDTGLSMDMKLIGELYEPEVALLPIGSRFT  
MGPKEAAKAVELIEPEVAIPMHYGTFFPIEQDPEEFKREVEELGLDVEVVILEPGESY  
ER

10 <SEQ ID No.:1543;PRT;Methanopyrus kandleri>  
LRVSPSEGARRVWRAIKTELSEHGPELGRLEEELSAAVPEDAEVKEIRAYGYRRSV  
GIFRRINRLWILIRGDESVAKDMERNLIDRIVEDPKVRHKLNWALRGALRVTTID  
DVRPEPEVIRRVTTLCALCGAASVLLGIEALAYPKRVVKLLPPAIAVSGAAGCLLPW  
15 RVGLLGLADDALDHPRRVTVPAVSLTLLVLGLVSSLLLPYLGTGFLGVVIAACVTG  
FVAARFVELINREVVKVE

20 <SEQ ID No.:1544;PRT;Methanopyrus kandleri>  
VSKVRREHGAGGELMESLIKEELLPNLTMRGEGSVTLDDLDDGATFPSVDGEMVM  
TTDAHIVDPFFFPGGNVGKLAAAGTANDLAVMGAKPVAFACSIVVREGFPIDDLKRV  
YRSIDGVLSLGAHLITGDTKVGNLTGDVDIVTMTGVGEIVELVRDCGLRPGDKIVIT  
GTVGDHGMALAAQQGLDLDLESDVAPVWEAVNAALEVGGVTSMKDPTRGGLAG  
ALNEMAEKSGVRIVIEEERIPIREEVRVLEMLGVNPLEVANEGKVVMGVRPDMVDD  
25 VLDAIRSTEVGKNAEIVGVVEEGTPRVEMETEVGGRRIVEKPVGDPVPRVC

25 <SEQ ID No.:1545;PRT;Methanopyrus kandleri>  
LGVWHGRSLRKPTGGRIRPHRKKRKFMGNPPTETLVGEERKLKERRGMGGNVK  
KGLKFATHANVADPETGEVKCVRIEEVKNPASQYYERHGVITKGAIIRTEIGLAKVT  
30 NRPGQEPVVNAVLIKEEEEEEG

30 <SEQ ID No.:1546;PRT;Methanopyrus kandleri>  
MHKVEVDVSEDLLLEVNRNLAREVRETLDENHVRAVEVLGSIGSGKTSLIEWIVKEYG  
DEYSFAVIAGDVVSEYDERRFKDLGVPTVGLNTGRECHLDAHVMQHGLEHLEELTD  
LNEVDVLFIEENVGNLVCADFPIGAHLRVVVSATEGEDVIGKHPMMIRKGDVLVWNK  
35 IDLADACGVSPETMVRTAKEINPDLEVYLTSIKTGEGMAELAERLLP

40 <SEQ ID No.:1547;PRT;Methanopyrus kandleri>  
LHELVAQSVLETVLDVARKRGAERVLSVRLRIGEFTLLNPEQLRFCLEVLAEGTPV  
EGAKFEIEIERGYFKCAECGHRWRPEDESLKDPSLHTAFDLSELTELLDLKCPKCGS  
RAVKLDGGDACSIESVRLEVPGEQHAQG

45 <SEQ ID No.:1548;PRT;Methanopyrus kandleri>  
VAGKLVLVGAGPGDPELLTFKAARAI SRGDVILKDRLPDEIIEHAPEDAEVIDVGK  
KPGGEGWTQEEINELIVREGSKGKTVVRVKSGDPLIFGRGAEEIEVALKHGMDVEV  
VPGVTSAGVPTSLGLPLTHRKCASSFAVATGHEDPSKPENRVDFGALAEAAADTLVV  
LMGARRLREIAREILEKRGNEPVAILERGTTEQERVKVGTLDEAAEGKLKARPPAVV  
VVGEVVKWWREVLGRETR

50 <SEQ ID No.:1549;PRT;Methanopyrus kandleri>  
LKAKVRTFRYLWHLLRDVISVPTVKYAVAYVAALLCLGTLGYWTLEGRSPVDAFYTT  
VLILTGVCANPPTTPAGEIFTVGLLAVGLGALIHISRVFAALLRGDVLLRIKESDAMA  
RIERM RDHVVICGYGKKGREIARNLGEHGFVVVDKDPEKCDRAFRDGH LAVQG

DVTSEETLLKAGVERAQAVALVTDSDETNVFACVLVRDLNPDWIVAAARSKTGAR  
TLLRAGADEVVRVYEAAGIVIANRLMDPLSFLVTVRHPLEDTFREFREIIRHGGIVVD  
VRYHIPSLPEPLVKDLWVEDESDVKRRLEMHEDSETREALERLHRMSDDVHSHRIIV  
RREEDKEKIVEALRRLXXXGVDMTHKEVLKEVFGVEA

5

<SEQ ID No.:1550;PRT;Methanopyrus kandleri>

LRALVWRAPGLERETVQAFKKVDLDAEVVCPVELVSLDRPKISAGLLSEYDAVAFTS  
PRTVEFLSEEEVKELRRSDVDIAAVGPRTREALERAGLRVDVMPTEYTTGKLAEELR  
QYGAVLALRSRRRTEDLRRTLESYGKAAEELEMYDLKPKRVEVNPRKFDVVCFLSA  
FTARCFLNVDPTEIPEPVVSIGPVTTKELRRAGLKVVEAEHTVEAVAKTALRVIEA

10

<SEQ ID No.:1551;PRT;Methanopyrus kandleri>

VAETPTVKLGKDRIVVWPAYFDADRSRSEGRKVPKRLAVRNPRLTEL RHIAEKLGL  
NPKVQRDKRYPKRWWDDKGR LIVDKVESKRKTLLMIAEKLKERRES

15

<SEQ ID No.:1552;PRT;Methanopyrus kandleri>

MLRPFSILAFIMVLGGAAHAISVQEYTWELTAINIKTAEGVIKAKFSKPQTVHFLVPEP  
DYDQVDFGRDVG DGIPDHMWCGELASLTLYNVAVAKGWWKPIAGNELTPEDLEK  
REEWFAKTTNIPVEDPQYDAPNASTDPPWFPALISLAADPEHPNAIGVVLYAPLTV  
SRWFVVVPPMMHAVVVMGATSNGRYFVVKDCSATQGP DYDWKHDYYLVAYSLE  
LNISRAIQDVFNP LEQYSSTMPVLFPIPTDGKLPPGLDEFFQGERTVDVGGGLKVR  
FYVFLASTLSDVLEICRH LAEAGVPVMCVVKEPFAWLAYQQGVLEVPLVGTHVLRIL  
SVPITAVEIAQPTNSNGAETQNQPTQPKVSNAEGEVEPKENESEANSQASPTSSKR  
RKIPLVPIVPALPRGTNRGRDSDGQVEG

20

25

<SEQ ID No.:1553;PRT;Methanopyrus kandleri>

MKRFELDVLPDKPGQLVKVLEPLSKIGGNVISISHSRDGDRA RVHIVFEATEDVAR  
EYSRRISELEGVKILRFGRGPGHETDVLIGHIVDTDIKDTIDRVNAIQGARVVDVDLE  
MPDPERESSAGFTLIYEDEEALRKAVQTIEEIAEEKDLVAIFPVEVIQCVRRASS

30

<SEQ ID No.:1554;PRT;Methanopyrus kandleri>

VRQARL FVIGLGAVGLGLMRLLAKKRDAYAREFGIDVRVVG VADSRGVVWKNDLDP  
AEVLKVKQELGTVAEVGESGDAL EIMEDVEFDVLVELTPTDIETGEPGLSHIMKAIEL  
GRHVVTANKGPLAVAYGEIMEAAEEAGVVVRYEATAGGAMPVFNLVRET LKSVDIH  
SIEGVLNGTVNYILTRMEEEGISLKDAIAEAQSRGIAEADPSMDIEGWD TACKVVILA  
NAILGLDCTIKD VDTGIEDITPEAIRIAEERGYRIKLIGRADSDGELS VRPCLVPKSDP  
VAKVRGVMNIVRLETDVAGDIYVSGRGAGPLETASAVMSDVLSIAESVG

35

<SEQ ID No.:1555;PRT;Methanopyrus kandleri>

VMTTATAGAASIYLG GKLASGKEAWKSEGKPLVELGTVLYATGLRLSDSPIPENVAL  
VAFRGLEHVHVYKREIDLNVPGFAQAVKKSVERPD DAFVEALKSMSPTLRYCVD SL  
LNHDRKLVVERFSRDILRVMKGALGSSPTVAEILDVIDEHVEEDEGWIPWNPVRALLEI  
LGWR

40

<SEQ ID No.:1556;PRT;Methanopyrus kandleri>

MIHTTLWIALAGVCLVLGIALISAIVVEGTIEATTWFTVADLAVCAA IYVGITGHQFS  
SLLPTVGLIVATLMVAHV TYTWIKGILRLVTGRESKSVGERPD TLRAFLTRVLEKLG  
YKGKVDPGDREAARRVLET CRRWGWR

45

<SEQ ID No.:1557;PRT;Methanopyrus kandleri>

50

MADVIAEFLGDGECTVEFEEEEKMELVSGKVAEPGHVTPYHLFLAGILACVTMNAGH  
ALEKAGIDAEVTA EVTGEKDWDR LAVTEIEITIKVKLKDDTDPDEARKIAEKGADRCIL  
SRTL GPAIVSKEVVVERES

5 <SEQ ID No.:1558;PRT;Methanopyrus kandleri>  
VSARGAPSYEDLRRHVLRYTVDDVKVVRLLPEFGRAEVGLADYDDAAVVRVDGKL  
VVSSDGPYAFRLVRKSALVHASTDVLVAGGEPRFAVDTIIAPTEKGALEAARRIGRQ  
ARALGIEILGGNTMIEDDVEEPKVSLTVMGPLVAPEPITDCGAEPGDSVLLVGEPHIG  
10 SFQERMERARRLFDTFPELARRGLVKA AKDVTKGGLVAMAALVCAKSGVGM DLNS  
VPYSSITRNWDNVLAVVSPDDVEEVLNVCAERGCPVTMLGEVIEEPVLRIAGRTLVD  
SELMAEIEDHFKTFKNFKKS

15 <SEQ ID No.:1559;PRT;Methanopyrus kandleri>  
LDVLDELYLRFREAVEVAGHSEIPSQFLQHWVARTLEDALEVVDLCPGDVMLEVG  
VGSEVGTFQDRPRRIDILVRDRVIIETKRPGELNSGGRLEEARDQLLRYFAYLVKER  
DVRPEDVLAVLTDGKIVVYVEVEKEELVQEGPKKLD RSEFRMIKTILRRIGEDPRPL  
ELSRTSVELNPTAVVQWIETWKEVRELLERVKKELTGDGRSERPRGPLL

20 <SEQ ID No.:1560;PRT;Methanopyrus kandleri>  
VGGLEAFLEILGLVFVGYTLRKVG VFSKDTPSHLNAYV VYLAMPALVFTAMLRAPIQ  
GLLQHLKL VVISMLLSVMCALIGFAVARKMARDRRDAMAVALASGLGNTGFLGYPV  
CLSTFGEPGLEAAVFYDFGTTLSVIAAYLMLSSRRENPLKMSLRFP PAHA AVAGMC  
WAALGLHLPDTIRSTLQLLGRSVVPVIMVSLGASLRWDLPKSVISVIPTV VVVKLCAS  
PVVAATIAPSGLDGKVAVLEAAMP PALMNLVLAELLGLRPHVTAALVFSTTVISLATV  
25 PTVIYLVSGGGGA

30 <SEQ ID No.:1561;PRT;Methanopyrus kandleri>  
MAKPYDVIVIGAGPAGLSAAIHAARAGAEV PVVAQELGGQLTTAPEVGNYPGFPPA  
PGYELVDRMVEHAETVGVELNVKYSNRVEGIELTDGTFRVLDEECRAVVIATGARP  
KRLGVPGERELEGRGVSYCAICDGP AFQNRIVAIVGSGTHAANTALFLSEIAERVYVI  
TPDGKLESPDRALIERVLSCRNV EVVHDEVRRIVGDERVEGVELSDGDILPCEGVFI  
AAGKVPNSEPFRLVETDDR GYIVVDSEMRTSLEGVYSAGDVTTIPHRNVPSAVYQ  
GSVAGINAAEYALKSR

35 <SEQ ID No.:1562;PRT;Methanopyrus kandleri>  
LKVIYV GAGPSGCWIARRVHEMGYDVT VITHPENRLQSERFGHYRVYYGEGLGGS  
ARYSMGNFWFWGPEGLRRPFERVLRDMTCEVRRTPDSVVS NLDIEFEEAAEDVGL  
E PERMPKSVHFDLCDGCGECLECPRNAKWVPQDELPEGVSVLRDKC IQLEFSGGK  
ATAIVLRSQTVELETDDIVVLCAGCPGTPRLLERSGIDADGPLFVDAYIHVVS DLEAE  
40 PGIQMPIVDMDEYILSPHRTSAYEGKYSIMVKIADELSDGVIGREKPI SVRETELFAE  
GCAVAGEIISRMGGRVRAVTEPSGAHPGGT LSDRVDDRYALEGYDNVYVVDANVL  
PEPLGKPPVGVILAMAEDFCDKLRRSE

45 <SEQ ID No.:1563;PRT;Methanopyrus kandleri>  
VILFSSSLSQYEGIELPTWRYVPPVLLAILLSSASPVAAGVAEMFHSEINEFRESLGLS  
PLKWSPSLARLAEQHAARMDETNELYHERCQGYNFENVARVPNTGEPTLTARLLAI  
TVLSSPPHRWNVLEGNCEGVGVSGDYAVLSQKISRASDDAVDVRVEVPPFHGVV  
STAHRDDVEKAVLDAINREREQSGLPPLVLDKELSKRVLEELREAARTLSVTCSSGT  
LVILTRLQNPVEIAEDVLGVLRAVPAGRNFWVPKGRLGVAALVTEVTMPDGNRLKL  
50 GVWVVGINVVEEMAGKNRPRRVFPFSYVAIAIPLCYLITRRQTFFTGRPQR

<SEQ ID No.:1564;PRT;Methanopyrus kandleri>

- VKRRINVAIAGHVDHKGSSLLERITGEFPDKEEFELSRGITAVMKVIPTTEWKGV EIRFI  
DTPGHSDFREEVGKALLVSDGLVLVVAADDGVQARTEVIIIEEANELGLPVVLAVNKM  
DKEGADFERVVKEVKERGLEPVTAVPTS AKTGE GIEDLLDAIVEHIEPRGWGDPDE  
GTAFLVVDVGEREGLGSVATGVVRAGTLKPGDELRYEGEVYRIRALLSPDEKRVRE  
5 ARPGDVVLAAMDRAPEAGVLLTETGGYRVENPEDVRPCVRYTVEVDDLKAREVL  
EDIERRNLGVETEIIDERRVKISCLGDVQFDKIRSELEEAGIQVEVTSREFEGVKTG  
GRAVGRFGPVEVEVLPRASEGVRFKRGKDRA TTKEVTTAHLVAEELGLDGLV VNI  
LSEGESPEALAEIAAAIEEAGIFELYPIENVLIEVDNVGKAASLVYKH EGQVIESDE  
SSIKAIVPAPRLNELVSDLMTETSGRARIRLLSSAGAGGPILSVDPGEVNFGIAYIPRR  
10 GPCDVT SVKLTGHTRDAKVEELRRTLKMFLADREEPNLVYVGNPGH DVAVEALG  
DVLPEAEIVLVDERETTKEAVYRLSSGKLENVRSRDLRDHGVAALAIARRGQLGRRV  
KKRVDREGVRRAVVTA FG GGSRRFGDYSRLPIRNPEELEE GTMLQVKDPNAIT TGL  
SKGEVVVFHGWREDGGMIASTLTGNRVIKPRDGRSLKNPRRFFEVFRPVKPKRSS  
RRGEG
- 15 <SEQ ID No.:1565;PRT;Methanopyrus kandleri>  
VLALFPLAHPFTITSED LRSVWRWIKTPDIVRVYTDSES LAELLKRPLLRAVRSSLRP  
PTVSWTGPCPEEDLRRAGA EVEMDEHRPFETSDVLALCTR TFALFLKGVRGGAVG  
LVGFGDLDDLHRYLV ELGYPRTFKATSTLMLRRREVEMDELWKLFP AWAGDDVEP  
20 LLRETLKPDVVEDLLEEARSLTSSLGPRVRDLESTPTGRLLASSQT VVWVKALNE
- <SEQ ID No.:1566;PRT;Methanopyrus kandleri>  
VILGEYVLRDLFPDLDEDQYQPAGIDKLDRVFRLEGRGALLEGDDKRLPEYREVET  
EGGVFELEPNVPYVLELAPELEIPEDTAVLFLPRSTLLRSGVSVHTALGDPGFRGKIR  
25 VLAVNHHAAPYRIAHGERVVQAVFLRAEDAGRYEGDYGR
- <SEQ ID No.:1567;PRT;Methanopyrus kandleri>  
MTVVVVVRKGRLVRSASGGVLEADSSSTLILTEEMNLLVDTGGEDPKGLIRDLEPYG  
VDAVVFTHGHQDHVGNARAIAETFHPEFYAHEREAGSIPVDVDPVDSFDPPEGVEV  
30 IETPGHTPGHISVVVEDRIVIAGDACPTPDNALERVPPAISWDRELAEE SLRKVLSYP  
VVIPGHHIHLKR
- <SEQ ID No.:1568;PRT;Methanopyrus kandleri>  
VSVVNLREEARKLEEELSGLLGRPVVPVVEVFVRRRCGCRGIVLYVKGLTLDDIEVL  
35 GELLSDAL SRLGDGCPVAELRRIGPEVRSLMLLEACDEHPPDEDPSLLPLR
- <SEQ ID No.:1569;PRT;Methanopyrus kandleri>  
VSVVHWSLYVNSAVISAAAALVLPNVPVYVYRHGGDEFTASLVLSTFSITMTITSLAS  
TSLLEGVRAGLPICLGLGYGWALLPFFVHDSVASLAFARALQGVCSGFSFPANVA  
40 AALQLGRSAVSKNNFW SNVGFIVGYLASSHV RDPFGICSVLSALA AVFGLPLTLRI  
QSQEDVSAYHGYPVAFGAALALT LASTLPNSAITLLAPKYGGDYGLVIAMMTAVGGV  
AQLLGPRLGELESTLLAVVLCVVSAA LGYSLASVLAAGTATGLMYAANVYSGGGR  
GVRAVSTAIGVGYAVNQ TIVGAILSAGLDGWR FATLMAAAITLV SLLGVRR
- 45 <SEQ ID No.:1570;PRT;Methanopyrus kandleri>  
LSGVEERLQEVRRGALIGIYGNILLSVLKIAIGHIASSWALVSDGVHSLGDTVSSVMVL  
LGAKVARKPPDARHMYGHYKAEALAGLVSM MVFTGLLLLWESLMRLRNPEPPT  
STLPLVVALGTVAAKEGMYRYTLRLAERVGSSALKADAKHHRSDALSSVAASVGIA  
GALLGYPWADPGAALVVS LMAHMGLELCWESVHELMDVAPEDELLERVHEIVENT  
50 LQDVDFDVELIAVRGRKMGPAYHFDVFVAADPEARLRELDTVRKRIVEGIRREISAA  
ELVTVEFVPM

- 5 <SEQ ID No.:1571;PRT;Methanopyrus kandleri>  
 MKVTGDVPGDIVVNIRVVDTFIHGKIKLWCYYDGLKTRNIETFGSVVISDDGDWTI  
 INLEDRIILLYDSNGIFEIKLENEYINVRWDVIKRWGSRKVRVNDDFEDIVPNK  
 YRLAIVGMMIEQLPGNNKKILYSILKDLASIKCEVTENGCSVVAESDGTPLKLGDIEN  
 PIKGIEANIDEEGRIIVSASDKPVYKPLYTGMETVTLRVSPIPVEVKVNGENVPIIGLPV  
 ISDLSGTLQVAITKDTILAGFIDGEGAFRWLGVYKE
- 10 <SEQ ID No.:1572;PRT;Methanopyrus kandleri>  
 MNVSTTLIFTTISPSTSPVTFIRTLPTSNLLFLTSSIVSLFENLNAKVFWVTLSPSGSL  
 ILSTRTLYFKCFELILANGTLVPKPLTISSIIKCSDFILFIFKSNPISILTSYSPSEAVKAIL  
 SFLLSYVSVVSDLAFLINTLFSVGTILIVSPMFNLLKIKRSFSFRLRLATLIRTMFAEV
- 15 <SEQ ID No.:1573;PRT;Methanopyrus kandleri>  
 MLAVAIAGVRSGCGKTSLSIGLVRALREEGTRVRPFKVGPDYIDPTYLEVAAGLEAF  
 NLDWMMMGESGVDAFGRYTRRCDAAVIEGVMGMFDGHGEGTVEGSTAHVAALL  
 GVPVVLVDCRSYATTVAEVRGFRDMAHEIGTRLEGVILNRVGSERHERLLITALR  
 RYCPDVRVFGVIPRLEDAVIPDRHLGLIPADERNEFAERVAEYWGGEVVAEHVDLDAL  
 RELEVEGPSVEPSPPPEPERVETKVAVISGRVFTFYRENLRFLAESAEVVPVDPEK  
 DRLPDVDAVYIPGGYPEVYADNLDRLMRDLLEFHEEGGRILGECGGLMYLCSEV  
 20 DADGDRHDMVGVDVAARMRERLAALGYVEGRVTDHHPFAPSGSEIRGHEFHYSV  
 VDVREDLEYAYRLSRGTGVREGDLGVKGNVASYTHLHRSDDGGVFRGLVQ
- 25 <SEQ ID No.:1574;PRT;Methanopyrus kandleri>  
 MVEITIVVDNRVGMVRDPYVARHGLAIIVETDSSLIFDTGPSANTLANNRLAGFDA  
 SFDHVVISHHWDHTGGLEAVEGTVHRPGGGEETLDDDVVTRTFEGEYEGRPMP  
 EQALIVGDVALIGCCHFDLEELLGEYEPKTVIGGLHLMGAPEEELERTAELFREYGV  
 REVYACHCTGLSESAYLAKVVGGEPAVYPMRMRF
- 30 <SEQ ID No.:1575;PRT;Methanopyrus kandleri>  
 MEERGHSLKAALRNALRGIGRRHRFVQALAHELVRVLGNVDLVLNRVLRGSTVED  
 LHPYLRLNALRVGTWEIHWRRHPGPVTKAVVDVVKERVGPKHARFANAILRQVER  
 VNPEEVISSIRDPTARFAARYNFPKWYVELVRSFDSMDELRFLEACNRRPARYV  
 RVNTLVSDPEEVVRLKRRGIEAERDPDVPDLRIRSAETPVIKTPEFKKGEVYPQT  
 KASAAVAHAAEPEPGMTVVDLCAAPGGKTTHLAQLMEGRGEIIAIDMHPKRFGTLK  
 35 KRVRQFHADDIVETLCMDARDAPDQLGEGIADLVLDPPCTGTGSVYSKPEKRWD  
 RETTGEPTKWAQLQWELLKVAVRLLKPGGRIVYSTCSITLTENERLIERLVRRYRGL  
 ELVDVPLEWASPGVRMPEARRIWPHRHDTDGFFVARVEA
- 40 <SEQ ID No.:1576;PRT;Methanopyrus kandleri>  
 MEKVGLRRELTM LGFISTICCTVIGGGVNVLT CMIQVKAPGVGPYVPLAFLIGAVPSL  
 VAGIVAGALSAAVPRAGGHYTYVSRLFDPLAFFSSWSRFVGEIGAFVAIAIGDVALL  
 AAMCKFWGAPAGKWLNAHTLEVATLIIFTWLVNVLGIRIYEAVVDVMFFILLTGFFI  
 VVGYGFAHSPA EYLKAIGGTTALKSLISQAGGLPKDVGTL SAIFSAAATLVFAYVGFE  
 TGTQAAGEVKKPEKTVFRGMLIALGIITAYYLLYSAAVYHVPWEYIYAKAALADKAG  
 45 SNFTVPEAMAPIMPSALAGYVAFVAAIALLSDLPPMFLSTSRMTFAWAYDGMFPGVF  
 AKVHKSFGTPHWALT VLMVSVILT WAVGKFLAAVDITT VALLFTYLFICMTGLVWKF  
 VRPDIYEKAPLGDKTKKAVNWL GATGTVLSLFFLGEIAISDPTS FYWWIALMVPGPFI  
 FYYAYNRTVKKLGPEKARERLMTIPPE
- 50 <SEQ ID No.:1577;PRT;Methanopyrus kandleri>  
 MTYGISKHLEISGEYRDKLLRGEKRATIRVGRVPGARPGKVYIHCGGYVYGKVRIT  
 NVRTKRVRLTD EDANLDGFENREELLKALRDHYPNLRDDDIVTII FEWVERFDEPI



LSEHLPYEGHDPPIEIAKRALEEDIPLSPRDRELLELLVECGSIRKAAKALGGLGKRDDVI  
RRAVRKAFRLLKSRGALKGRR

5 <SEQ ID No.:1578;PRT;Methanopyrus kandleri>  
MSENDLLVPLNDYLAAGVHIGTQQKTKDMEPFYRTRADGLHVIDVRKTDERIRIAA  
NFLSMYNTDEILVVSRRYYGQKPVSKFAEATGTTAIPGRFVPGTLTNPEYDGYLEPE  
VIVLTDPRADFQALVEAQSVGIIVALCDTDNFTGNVDLAIPTNNKGRKALALVYWLL  
ARELLKKLGRLEEDEEFEDPEDFEGPPPR

10 <SEQ ID No.:1579;PRT;Methanopyrus kandleri>  
VPKVVIDYDACVGVSEÇGECIEACPMDDLDEEDDKPVVNNEDDCTGCGLCEQACP  
HGAIEVEV

15 <SEQ ID No.:1580;PRT;Methanopyrus kandleri>  
MEDLTRFEIARIVGARALQIAMGSPVLVEVEGEDPLEIAKREFDEGVVPVVIRR

20 <SEQ ID No.:1581;PRT;Methanopyrus kandleri>  
VSGNPSGALQRVNDLELDPIGLLKDAVATPSVTGEEHEMTRLLTEVLDEHGVPEV  
DEMGNVLAGDLSGLVLNAHLDTVPPGDGWEVTDPFDPTRNGKLYGRGAADCKGG  
LAAATAAVVQGYEEMPMGLLATVGEESSEEDNGTLHVCRTRELEARAGIVCEPT  
DGRVHVGDGRITLRVTVRGRSAHASTPEMGKNPIEAASRVVEALSKLRPTEYRLP  
EIGTVRSDLTVTRIEADGPSNVIPERCMTVDYRTVPGESTKEVKRRVERVAKRAVP  
SGFEVSVGIESASRATVVNVEAPVVKA VIAARKVGLPGKLDKFRGHCDIEYLVHEA  
GLDAVILGPSGGNIHGPDEWVKVEDVVR CARAYLACANLLPTPH

25 <SEQ ID No.:1582;PRT;Methanopyrus kandleri>  
VKPLEHPEVTRAVMVPFTKVAAGILRFADIEIVGICDYREEKVGKTTKELVGDDVPEL  
EIRPMEDLEELLEAEWLWTKEVLDEDVHYLKWREAVDEAVVKGVNVNMGRLH  
MVAQDPNWKLEAHKRGVQYFDTSDPELYLEYLHYGMKAREEGVNADVSVIGTGR  
30 RTGKFTTLNTARRILEEEGINVRSVGTEPSSLLTGSEAMVIPQVLPMAHAAGTVYGA  
VKKLDEEYEPDLILVGAQTGV TADPLEVGTGRGGS LAALTILLGSDPDRMVVATRPE  
LLNGLQDVVEV TLLTGARVQFVSVNGKDYSEEEVREVCERIEDEFGLPAADPIKME  
EEFRDLVLDLIAPG

35 <SEQ ID No.:1583;PRT;Methanopyrus kandleri>  
VKGEETKQLARKVAEEYGVLLTPEALRELEDEDDAPEVLEKSDEVDLPVFTAQLIRG  
EVDPDFLEGMEGDVYEILEAESEEEHEARPRARPSKLPPAAEVDAEVEILEEARS  
VSANGSVEGFVAHFDRLEKLRPLVKAKLDGEWVKDIGELVERARREPGNYCVAG  
VVTGLRETERAFLLDLEDEAGKVRVVISKPKAPKISEKVRRDVAPGMVIGVKGFVKV  
40 ERGPVMFVGDRYGEVTLPGEGDHKS RVPAVEDDV KAVFIGDVHIGSKKFREDLFR  
RFLEWLNDPNPNDPVASRVKYVIVTGDVVDGIGIYPGQREELEIADIDEQYQRFAEYLEL  
LPDWVEVIVIPGNHDALRQALPQPSLSSSDPAQPLTELDGVHLPSNPALVRIHGELD  
VLLFHGQSLDDIIIDHPDAEHNPDGVRKAVKLCLRARHLVPIYGGSVPIAPLPEDYLAI  
RKLPVHLAVGHTHVSAVEVWNGCNVISTATFQEQTFFQKKVGISPTVGRVIVLNM  
45 RDEYENPKRRFTIVDLTG

50 <SEQ ID No.:1584;PRT;Methanopyrus kandleri>  
LRPVVWTVRIAAAAILVAMTASGFLFAVSLTGKSPVDPQLVMRMSSDLARGDYDAF  
NRDFAMAYLQLTSRLHEGLQTLLEYLGIAKAFIKEEVKKKLFYRVRVVNSDEVCTK  
LTELAVDDIAKGKLMVYADTKSEPNKGTKVLIKAIGYVEKV KIKGETIIISTPYIEAE  
GMGIYNGDKEVIIDVNTIKLRQVRRL

<SEQ ID No.:1585;PRT;Methanopyrus kandleri>

MKVPSSSLAGLRRTVAELCKEVHRAGLTIGGSGNVSVRSGRYVAVSPSGFRLSDV  
RPRHVPDIVDVEGREVLGTTKPTSELLMHLSTLYREVGDGVVIHTHSPYLTALVHSGNR  
PPETEDLRRSVGEIVWVEYQPPGSERLAEAVAKVARKPMVAALERHGGGLVADRP  
5 EAALRLAEALEEAARLAVLRPHP

<SEQ ID No.:1586;PRT;Methanopyrus kandleri>

MRNGPPKPPFRKIFFKVSEARQQSSSEGGGDLSDYEEKFEQCCTLLEQRRIQDDQIP  
RNVRRAAKQAIEALKEEGQSPGVRATAISTLEEVVNDQNTPEYARTVLLQVIATLE  
10 QVKDEV

<SEQ ID No.:1587;PRT;Methanopyrus kandleri>

LKKIFRNGGFGGPFLMRSGINRDVIEVLMDVYGLTERQATVSVMRSEGMSYREIAE  
ELGITVSGVRNHLEQARMKMKVDNDFQIARIIGKLEMSLGPALVIAIVPDKSEVIN  
15 RLIQEGEGVTEMTGRGGYTGEQSVLFIITEDEKKVREIIIEEVGREVPMFVMRAPA  
AFPSP

<SEQ ID No.:1588;PRT;Methanopyrus kandleri>

LRGNPDIKRSDLNKAERLLAGHKMLGIHCPECKVPLFQDPKTGTVSCPICGTEFEV  
20 VEEEEAKKVKRKAKERRKRAESEEKTKWAEKKPESGKKERKPEKEKQRRPRLPG  
SEDEVKAALQVVTARLKRAAETKDPEHALRELEVAEKALEILKKL

<SEQ ID No.:1589;PRT;Methanopyrus kandleri>

LPRKHSRSSKSKCLVFGVWNRQFSELAIELEFEVGAVQFYDPDDQPGDVISYVRE  
25 GPGRLLPRFRPPDDQWLIRALEELQPDVIVPTSEFAVEAAFRSTSKKLGAEYAGNEPE  
VWVAADKLELFNRLSDVLPMPETSEDPSELGVETLVEKPVRGAGGLGVRKVKLDE  
ADPRPGVIFQEFVPGRHVSFTFVSDGSDVRVLSVNDQLIDLRSEYSYKGNLVPSPY  
HLVPSVREEARRVCEVLVDELGLVGLNGVDAVLNKGHLHVEVNPRPTAVTECLAR  
VSGDNPIRLHLQAFDGLPERWKIRGWSCRWVYAPNTVRVPYLSWTRDRPRPGT  
30 VIPRGEPVCSVIASSSTPSGARSMARLERVVVNRLEVRVSSSTPPTEGWY

<SEQ ID No.:1590;PRT;Methanopyrus kandleri>

LSDELHGIGHEVVLVDIYGTCDARPYPILRRAFGRFDFIAPVHCGVDFGTVEGPR  
35 VTHHALAGALAARYKQDFLFEVTGVRGKTTTATYLAWILEEAGHRPALSTTDESPV  
GRPSVTPARVVEVVRETSGPYVCEVSLGVTSAADYAVFTGAPYDYPIAGGSSSALR  
AKKKTLLSEGAEVMIEYREAVKLSLVGPKVHRVHTSDGTVKCDDICVEFEAFDIPFH  
DRCFGLAAATALTSGLADREDVEAARARGPVPSRLELRRNELVDAHSVNEQTVR  
YALSVASDLWGRYGAVIGGTLGGYCEGVDPEAVAELQERIERGELVALKLKGELG  
40 REVERHLENVDLPEPGPDTPIVRIVRKGD

<SEQ ID No.:1591;PRT;Methanopyrus kandleri>

LAEVQREFVMIKPDGVVRGLVGEVIRRLERKGLKIVALEMRQLDRETAEKLYEEHRD  
45 KPFFEDLIEYVTSGPVVVMIVEGRKAVKVVNRNIIGATDPAEAAPGTVRGDFALDIGN  
VHASDSPESAEREIEIVFGKDLSTIDYERCDEEWLYES

<SEQ ID No.:1592;PRT;Methanopyrus kandleri>

LGVKRGGTSLDDGFEGTLEEAVEFLEDLEGTAVRLYVHNDADGLTAGALMAFTLRC  
50 LEVPTRLRLVNTETELLKEDLDGPTVVDMGSGILDKLRNDHPVLVIDHHEISSKPSD  
NVLLVNPREGVDGGTEASASTVAYLLCRRVVKVEETCLPKAALVGAYGDNQAGK  
RGVRGLNRVPEEDGEKHEIIEIRDPAYWVFGASMTVGEIVERVSGASVREALEAR  
FGDLDVAPVDLSREDEAEIVREHRELLSGEKRKELESKTGRIHVDFEERPLKALRDP  
LETATLLNACGRYGEGWAGVLIAMGSWDPLQLAKKLRSKHKAIREALSRLSRGEGI

TDRESMVVIDGRELGIPTVVGIVAQFVCEERERVTVGVAEMEEGLVKVSIRCPENS  
DVDAAEVIKEAADRDVGEGGGHERAAGAEVPEDRLEEFLLLELEKLL

<SEQ ID No.:1593;PRT;Methanopyrus kandleri>

5 LARMHSRDRGKSGSTRPPRVAPPSWVEYSPEEVESLVVDLAKQGYEPAMIGIKLR  
DEYGIPDVKLITGKKITEILEEHGLAPELPEDLLNLIRRAKRVREHLKRHPKDLHSKRG  
LQLIESKIHRLVKYYKRKGVLPEDWKYDPEALHVE

<SEQ ID No.:1594;PRT;Methanopyrus kandleri>

10 MKVLFATGNIGKYHEAKQILARYGIEVERVDLDYPELQSDSLEEIAAYGARYCAESL  
GQPVIVEDSGLFIEALNGFPGPYSAVFDITGNEGILKLLEGEENRKAEFISVVGyce  
PGGRPVTFTGEIRGRIAEPRGEEGFGYDPIFIPEGEDSTFAELGVEEKCKISHRTKA  
LERFAEWYKNNVAGR

<SEQ ID No.:1595;PRT;Methanopyrus kandleri>

15 LSESNKAIRQPIISVLGHVDHGKTTLLDKIRGTAVAAKEAGGITQHIGASEIPLEVVKEI  
CGPLLEQLDVEITIPGLLFIDTPGHEAFTNLRRRGALADAILVIDIMEGVMPQTEEAL  
RILRRYRTPFVVAANKVDRVPGWKSHEDTPFLESFQKQSPEVQQRLEEKVYELIGQ  
LHQHGFQAERFDRVRDFTRTVAIVPTSGVTGEGIPPELLMVTGLAQRFLLEEQLKIEV  
20 EGP GKAAILEVKEEPGLGHTVDAILYDGIIRTGDTIVIGHPEEPIVTRVRSLLKPKPLDE  
MRDPSDRFRKVDEVTAAAGVKISAPELEEAVAGAPLRVGEDEDVEEVVREVQEE  
VEEVTIETDQEGIIKADTLGTLEAVVGEFKEKDVPIRKADVGDITKKDVIEAHAVA EK  
DPLLGVIVGFNVGVTEEARELADEYDVDIIDDVIYELVEKYEEMVEKRIERERRKRLD  
ELVRPGKIKVLPGYIFRQSKPAIVGVQVLAVIKPGYPLMREDGRELGEIKQIQMHGE  
25 PIKEAKKGQEVASIEGPIVGRHFEEGDILYDVPSEHAKLMFEEFKDLLTEDELEALK  
EIAEIKRKEDPFYGM

<SEQ ID No.:1596;PRT;Methanopyrus kandleri>

30 LIAVLLVLLALPTSGCCEAVWTVYDWGSKGNILKNPVLVQHAPHGPRSEVVYRHSV  
EGTVVFEFRGGPGPAVLLTAGVHGDEWTVIALLKLLDALSPSTSVIGTVYVIPAVNPA  
GLAANSRLVDGVDPNRTADIPGSLTWHLVRFALSHRVKYWLDMHCGSGVPRQGA  
LTDEESEFVDELARSSGFVPLVKSAPRGSIRSVARRFGIDVITLEVPRDAGPSGVER  
AYHAALAFRLTGALRRGQSRTPASGSANVTVPVLPVPAIVPRRRLG

<SEQ ID No.:1597;PRT;Methanopyrus kandleri>

35 LYKQVIVVRGDLKLSRGKLAQVAHASLGAFLRAKESGAPVEEWLREGQKKVVLKC  
KDKEELLEHELAKRRGLPSFLVRDAGLTELEPGTVTCLGIGPEREEEEIDRVTDGLPL  
LR

<SEQ ID No.:1598;PRT;Methanopyrus kandleri>

40 MSKPMYVKFEVPEELAEKAYEALDIARDTGRIRKGTNETTKAVEREEAVLVLIAEDV  
DPEEVVAHLPELCDEKGIPYVYVPSKDELGAAAGIDVAAASACIIDPGDAKDLVDEIIE  
KVEELRE

<SEQ ID No.:1599;PRT;Methanopyrus kandleri>

45 LKVLALLVLAWLAYAFLGFVKFYATTGCLPLGR LAFVKLHDPDIRPGGLHEMVATNV  
AHTLGYSAVTIVHNAGNERMYGSWTEKNGVLVWNIAALDPRGNRASVDWHGALRE  
LVFADRLRTATWVHDGPIGGPRFPKNSVIFWHGTVRNGFPLLYGGCGCEPYYYILA  
NYGNVPFAITATVLGWFTPLISPLEAFWELSHYKRLQYEYLLKKVNGIRLINLKNYEG  
50 TSATPTDSISGNSVPRP

<SEQ ID No.:1600;PRT;Methanopyrus kandleri>

- LVGRYTRKLEDAELALTFDDVLLPERSSVEPADVDVSTRVTVNYRINIPILSAAMDT  
 VTEAEMAAMARHGGLGVIHRNMTVEEQVKEVRRVKEARDVVQRDVVTISPDESVK  
 RAVELMEKHDVGGPLPVVDEEGKVVGITRRDVGLLSEEEIGELDVKSVMTEEPVIE  
 EGEDLEERALRVMREEKIERVPVVDDEGRLLGIVTAKDVTTELRETEAATDEERRYL  
 5 AAAAVGPKDPDRAIALDEAGADILVVDCAHAHTETVINFVKEIKREVDADIAGNIATA  
 EAAEDLIAAGADALKVGIGPGSICITRIVAGVGVQITAVAWVADVAEEHDIPVIADG  
 GIRYSGDIAKAIAGADAVMLGNLLAGTDEAPGRVIRLRGRLYKQYRGMGSLGAMM  
 KGESADRYFKQPEQGGRRHVAQTKFVPEGVEGVVPYKGPVSEVLYTLVGGLRSSM  
 GYVGAKNIEEMKKKARFVRITRAGYEESHPHDIAITDEAPNYPISNQ
- 10 <SEQ ID No.:1601;PRT;Methanopyrus kandleri>  
 LGELADAVREHLVSATLNAIGLIVILVIQLVVPPLASLGTMIPIGIGVPVNMVLTAVGV  
 VLALYFAYGVLKHVKPMITPAADLVSMVLLGRREEDLRTATYNLVLAIVLVAVLLS  
 PLMVSVPGAGAVLSLLVLLVGIGFGGLLLIKAATGFYEVFRDKLEELAENLAERVEEL  
 15 ERKASETEETESEE
- 20 <SEQ ID No.:1602;PRT;Methanopyrus kandleri>  
 MRPRLLVSPVNRDEALEAVEGGAHIIDVKNPEEGSLGANFPWVIREIMEVVPEDREV  
 SATVGDPYKPGTVAQAVLGVAAGVVDYAKVGLYGTKEEEALEVMRACSRVRE  
 FGYDTRVVAAGYADAHVGSGLDPMSPVEVAAEAECVAMVDTAVKDGKRLFDLS  
 EEEVGEFVDSAHEHGLEVALAGSLRHEDMPIVRDLGADIVGVRGAACERGDRNRG  
 AIRSHLVRKLAELA
- 25 <SEQ ID No.:1603;PRT;Methanopyrus kandleri>  
 VRSLSVLITALTIPLGVAGQIMTPEEVSELPYNHPVIVDVVAGPPEADSIEAYTRIVWM  
 DPITHERHIEEEVEVRTSNTLLNWWWASPHRPATCTLMVSFDDRRVLERTVRLQAN  
 GIVQESLELDVTSGRHTLSVEVTDGGTEDIVSCNLRVEPSENGGGENNQVHPFQGL  
 VLWPRRRRRRW
- 30 <SEQ ID No.:1604;PRT;Methanopyrus kandleri>  
 MASSSKETMVIIAEKPSLAGTIAGFLRGSWDGRKLLGFGRYRGRRFAITSLSGHVLE  
 WWPKDDPGFRHPDYFPDPPGDFELRPIDGKERFLRAVERVKRYAGCRADRVIVAT  
 DNDAEGELIGWEVLVWLKRQGGGLDDPECARRMRFSAYTREDVLRLEGALRGERI  
 DPSLAYSALARTIADWLYGIPLTRRLSLCNDIVSVGRVQTPTLKLVERERERRKA  
 35 QKKRRYYWILQAETPIGELRTEEFKDGRRARELASEIESIRVVEVRRERRSVRPT  
 PFNLTTLQRAAGKILRISPKRTLDAQRLYEEGMITYPRTATNRYPSTFDHEELLRL  
 RNAHPDALRDFQRTGRRSEPVSGKEYDGAHPPTPTGRRKYIRGKLAWRLYDLVR  
 RYLATLSEDALVVKWRIVAEHPGTGTRFVMEGTEVERDGWYSVYPWEKPRESTMP  
 DVSEGDEL PANVNASRRRKPLPRYSQSRLVAKMKKLGLGTESTRAEIVKKLFDRG  
 40 YVKRAGSGVAPTKRGERLVELLEDVPELVSVELTRIEREMEEISELPPKRARERL  
 ERVAREIRETVRRNSKKLSAKVV
- 45 <SEQ ID No.:1605;PRT;Methanopyrus kandleri>  
 MTSTEKARIRRMVWEELEESGEAAPPFPVEGRIPNFKGALVAARRLTSTPEYEEAE  
 VVKVNPDSQPVRERARLDGKILIMPTPRLKRGFLVKNPKDPRRASTIRGAFQE  
 GELTMPDELPAVDLVVAGSVAVAPDGARVGKGGGYFDLEWGILAQLDLVDEDTPIH  
 TTVHDIQVLPPEIPMEEHDVPVDVIHTPTGTTECVRRYEKPGGLLEDRIDEKIREIR  
 WLREYVSAGST
- 50 <SEQ ID No.:1606;PRT;Methanopyrus kandleri>  
 LDARELIDKYHMNTYSRFPVTLVPGEGARVWDDGNEYIDLVAGIAVNVLGHCHPA  
 VVEAVKEQVERLIHCSNLYYNEPQAEARLLAEAPKDLNKVFFCNSGTESVECAIK

- 5 LARKFTGCTKFIAFEGGFHGRMGALSATWKPEFREPFELVPEFEHVPYGDVNAV  
EKAIDDDTAIVVQGEAGVRIPPEGFLRELRELCDEHGLLLIVDEVQSGMGRTG  
QFFAFEHEDVLPDIVCLAKGLGGGVVPGATIAREEVAEAFEPGDHGSTFGGNPLAC  
AAVCAAVSTVLEENLPEAAERKGKGLAMRILSEAEDVVEEVRGRGLMMGVEVGDD  
RAKDVAREMLDRGALVNVTSQDVIRLVPLVIGEDELEKALAEALADALRASG
- 10 <SEQ ID No.:1607;PRT;Methanopyrus kandleri>  
LGFQIEGVIPALITPFTDDLKGINEEGLRENVSRLEAGVHGVVPAGTTGESSTLSHA  
EHRRVIEIVVDEVNGKVPVIAGAGSNSTREALELSTYAEDVGADAILSVVPYNNKPP  
QEGFLFIHFSKIAEAVECPILYNVPSRTGCALEPETAACKLAEEYSHIVGVKEASGDLV  
VQRFIEETPDDFILLSGVDELTLPIAVGGVGVISVTANVAPELMVEMYEAWKSGDV  
ERARELHYELLPLHRLFTETNPIPVKAARELVGMASPPRPPLKEAREDTKELLRR  
ELKKLGLLPEGG
- 15 <SEQ ID No.:1608;PRT;Methanopyrus kandleri>  
MGKVRPTFVKRPAREIVEKYEEYLTDFEHNKKVVEIVARPKTKKLRNMIAGYVTHL  
MRLKERQREEGTE
- 20 <SEQ ID No.:1609;PRT;Methanopyrus kandleri>  
LNVLEELRREIDRIDECLLDVIERLKVAREIGRVKAQEGPLTDEEREKELRERWRK  
RFKTEGLDPALADIVLASILKVSKEVQRGVIGDG
- 25 <SEQ ID No.:1610;PRT;Methanopyrus kandleri>  
LGEGLIAYAAGTVVNAISAKKGCAYALDLTVSVRAELSDSTEIHTDVEDTSLVERC  
VGEHVGQELNFEIEVDSEIPIAMGLASSAVSNVVEALLKELGREPEPFVRLGV  
EASIRAGVTVTGAYDDACASYLGGVLTLNDQHRVLDIRELPYPYAVILLPGGKVETS  
EVDVNRLELLAPAAETAFFRAMTG DYRGAMLINSVYCSALGHEFEPVVEALEAGA  
AAAGLSGTGPAFVALCETKSDVREVSEVWSDRGEVLETRTVGPERARGAQARNRP  
HR
- 30 <SEQ ID No.:1611;PRT;Methanopyrus kandleri>  
VKKTIESLGDIGDVLAEKKNTVELRIVECPFSQDVKRELLKRDKVPVVCPPASLVLKA  
TEETFGVRMRTASIDIDEEECRFVMERLE
- 35 <SEQ ID No.:1612;PRT;Methanopyrus kandleri>  
VIGFADRLAEITKKIKGASIIDEDFVKEVVRDVQRALLEADVVDVKLVLELSKRIEKRALE  
EPPAGVPKR DYLLRIVYEELVELLGGEKTEGLDIDLSRDVNVIMLVGLYGMGKTTT  
AAKLARYLQKRGYRVGLVGADPYRPAAGEQLRQLAEEDVVPVHVEDVDDAVEMAV  
KGVEALKDECDVIVDTAGRDRLSEDLIDELREMAERIEPHEVLLVLDATVGQKAGD  
40 HAEAFHEAVQLTG VVITKLDTAAGGGGALS AVARTGAPIKFVGTGERVDDLEEFNPR  
SFVARLLGIGDIDELLRRTEEMLEEEKAEDVLEGEFTLKDLYEQLEALS KMGPV  
LLQYVPGMGGGRNVRKISQITEERLKKYKVMDSMTEKELENPEILNKSRIIRRIAIGS  
GTSERDVIELLNHYRMMKDVIEDIQSGRIPRIGGELGRVIRNVLRG
- 45 <SEQ ID No.:1613;PRT;Methanopyrus kandleri>  
VPSSLFGKMSVLSKVKEKVAKRVEERAEAEAAKVKEVETMPEDLKKPTLKERLK  
RVVKREVTITEADIEDILDELELELISNDVAVEVAESIREELKKELVGRRVKGKSEIPKV  
VEEGFREALLSVLEPKKEVDLMETVEKARQDGRPAIIMFVGVNGSGKTTTIAKVAKL  
LKD HGYSVWIAAADTFRAAAIEQLEEHAERLGVTLIKGERGDDPTAVAFNAVQHAEA  
50 KGKDVVLVDTAGRAYTDVNLMEELKKMKRVLEPDLVVFVG DALAGNDAIEQAKTFH  
EYVGIDCAILTKVDADAKGGAVLSISKVTGAPILYLG VGGDYDDLKAFSPEWFFVERVI  
GGEES

- 5 <SEQ ID No.:1614;PRT;Methanopyrus kandleri>  
MAEKKNEQEIQQELQRLIAEINRLQGQMEAINAQIDLISSISELNRVEETLKGVKELE  
GDEEVLVPVGAQSFVRACVTDTERVIVGIGAGVAVERTIDEALESIDDRQRELEKAR  
AEAQQKLQELAQELQEKQRKAQELAQQLEGAQRIAQQSGGG
- 10 <SEQ ID No.:1615;PRT;Methanopyrus kandleri>  
MSEVKVFEVRGTFRMGDEPRQPFTRQVPATSEEEALEKVYSDLGSEHGVSRMEIQI  
EEIREIDPSKVEDPILRLLGVEE
- 15 <SEQ ID No.:1616;PRT;Methanopyrus kandleri>  
MTVVKASVHGDPNIGAWIAASEEYAVVAPKVPDDIVERVKEALDVEVVRTTVAGSNL  
VGALLAVNSNGALFPRHAREHEIRVVRELGVEVDVLP SKMNAVGNLVL TNDHGALV  
HPDLDDHALEVIESVLGGRVVRGELGGVKT VGSAGVANSKGAVVHPGATEEEMER  
VSEVLGVDVEVGT VNRGSPYVGVGVVNSKGAVVGEDTTGP ELARLEDALYLI
- 20 <SEQ ID No.:1617;PRT;Methanopyrus kandleri>  
VAEVD DERVYTVPLRDAKKAPLKKRAPRAVKALRQFIERHMKAE EVRIGNDVNEKI  
WERGIKKPPSKIRVRAVKYADGTVEVRLAE
- 25 <SEQ ID No.:1618;PRT;Methanopyrus kandleri>  
LARVKPLGKKLRMAKA IKQNR RVPPWV VAKTGGRVIDNPKRRHWRRSKLKP
- 30 <SEQ ID No.:1619;PRT;Methanopyrus kandleri>  
MTDPELERIRRKIMELQRKLEESQEKKVEEEREKKALEEAQRRAMLRRILTPEARE  
RLARVRLARPQLAQAVENYLLQLAQ TGQLKEKIDEDQLKRILKQVSDATRKEYRIRF  
KRK
- 35 <SEQ ID No.:1620;PRT;Methanopyrus kandleri>  
VYDAYVVP GSELVERLA EKLD FEEIKPPEWAKYVKTGRHKERPPEDPDWWYMRA  
ASILRRVYMDGPVGVSR LRTYYGGRQDRGARPERFRK GSGAIIRKILQ QLEEAGLV  
EKTEEGRVVTPEGRSLVDSTAHEIAKEKGYTDKFTSPI
- 40 <SEQ ID No.:1621;PRT;Methanopyrus kandleri>  
VTQVKRLSGKERRALRARAVLLDPVVRIGKKGLTSGV IQEVDRQLEERGLIKVRFER  
NILRRYDRKELAEELARKVNAELIDVRGRTAVLFRPREGWRRFHGLSR
- 45 <SEQ ID No.:1622;PRT;Methanopyrus kandleri>  
VCKVESPRSGVLLLRRIALERAERLLRLARTVYYEDPD RARRYVELARRIAMKARVK  
LPKHLKRSFCKRCNTPLIPGVTARVRLRQNRMPHVS VTCLECGYIYRYPYLREVKE  
RRRRHMEGVKDRDAG
- 50 <SEQ ID No.:1623;PRT;Methanopyrus kandleri>  
LRNSNTPERGDSTLHTWLLLWLLLPMTPAQADPTSHYLEVHPDTPVTPTEGSPLVP  
AYVELTDEGKEAALSLLERLGIPSDEAAVGYLADVFVGESCHGGTRCLV VYNPQDT  
TVEVRPWEEDRLPLRLPPLRLDDHLTELLCLPVREQITLQPAVLELGWNLEMMQR  
CTKAVRLHKFGEPTAVIAVYVPTETAALRAFESLLPDPRNVARAMLERLSSEVRDAI  
DEYLVRDRLERLVKSRLGSDVYDRVREYFSSMIHLTVSKIEELYDERVLPALIEWCA  
AIVRYVETSLITAFALLYPDNPSADVLERRVAVYN SPYFQILRDWLLPEPSYTAWKSVL  
CDLAVTVADSIFEAAPVLSALRLDSESSRTTLEEITKSAVKNFIEALGPCLRTVLELL  
LLDTLMGLAWAC

<SEQ ID No.:1624;PRT;Methanopyrus kandleri>

LSKDSVRAASTGHTHGAGVGLLRFLQRRVLIVGCGNELFGDDGFGPAVIKEIERRG  
WEHPDVEILDAGAGAPQNVFSLIDEDSKVEYMMVVDAVDVGAEPGTLLEFGPEDLD  
PNCRIVPVDAGHWSIESALLDLNERIGIDFRILGCQVKELPIPEVQPGLSDPVRKAVP  
5 KAADRAIELAERYLGEKTR

<SEQ ID No.:1625;PRT;Methanopyrus kandleri>

VIQGWSALRRGRLNLEAVIRALAAERMASELPLVEVAARLDVDPSTVSHYLSGDYP  
SEETRDKVRVVEETPPFGLWPQLREALGVDVAAEALKWVMGPRTEAEPDVDDE  
10 RCLACGRCEICPSPDGECLGCGECVRACPSGARSLSVRYRGLVYRVFSPK

<SEQ ID No.:1626;PRT;Methanopyrus kandleri>

LSLLKLVKGS�TVLVGSLFLRLGGYVYRLLVGRLLGPDGYGIVSSTMVIQTIVMFLAT  
FGVPPAVARYVAKYHALGEGTKVRQFIVIPTLVLVALSTLAALILALTAPYLASWYFH  
15 NPRLYTPLLIMAIGLPFAAFASCVRGVFQGFQDMRRYVLTQFVEQGTRVGGAPALIL  
AGYGPAGAVFASATLAYATSGLYGAAKLRSEYLPKIPREGEPLPSDRVAKDALTFGL  
PVALTGADMIQSNVDLLAIGYFLGTLWVGYYDAAGPIARLPTTLCAAVATALLPAAS  
EAEALKDERTLRQYAHIAIKTMWTLIPVAVLTGALAEPLITLFFGPAFRPGAQALYVL  
PTAMAFIVFRSCASLLQGIGRERLPLVLSFSLVANVVLNAIMVPKWGIFGASVATA  
20 ISDWLAMILIVRAVMVHAKHLKRWALVPVIAGVAAWLTTEWSMLFTNGALLKLL  
GSAVGTLYSILLVVLGGVSDLEWELLEKGARRVGSPGIVRVRLARSLDILGRIKP

<SEQ ID No.:1627;PRT;Methanopyrus kandleri>

LSEREQLIYLNELVPREEAKISVYDHGFLYGDGVFEGIRAYDGRIFKLDEHVDRLYD  
25 SAKAIMLEIPMTKEKMKEAIIETVRANELRDAYIRVVSRGEGDLGLDPEKCPEPNV  
IIAEPMEPLYGDLYEKGIEVITASVRRIPPDALDPKIKSCNYLNNILAKIQANLAGADEAI  
MLDHEGYVCEGTGDNVFFVEDGTVYTPPEDTILRGITRATVMEICEELGIPVEEKRT  
LGELYAADEVFLTGTAAEVAPVRKVDGRKIGEECPGPITRRIMEAFRELTKKEGTPV  
YEE  
30

<SEQ ID No.:1628;PRT;Methanopyrus kandleri>

MAERIVREVLREARRRGVSVSDLFSSEGWVVNEITDRISRVLGSVGAPSEDVRESIL  
EETSSKLKSPPTYLSSIAETVSQVLPWGEEDADALPDHDFSEKVLDDLLEGAEFFVC  
35 LASPWVSSPKDLVEEGVRSRLRGLSDRDLELYLLVAAGENEREVLEWASLGFEVRE  
AEGRREGDLGIHCKVYANEKLALGASWNLTVSSLRRLRAMREVHTINPKADDCEVC  
NANYEQLVSEFNSQWSEAKQRFFRDEGLKGPAIFEVRWDGDRPTEVVIYRENGER  
WFTVELEDNHEGFVFNEREGLPVRRGVPRVHRFDLRGSRRRGQDRLSLRRTQAR  
EDPSGASGCRRAGREMER

<SEQ ID No.:1629;PRT;Methanopyrus kandleri>

VRWKDNAKKYKHQLTGRPYDGALVWGLDPDPRSDFYVAGGKLLVIRCEESGGSI  
40 TVEFVDAADPGNLPDWVSGSVDLGWLFDRSSGEGTPTLFVYD

<SEQ ID No.:1630;PRT;Methanopyrus kandleri>

MENQLLAVKALVLVETRGMPIPEAVERTCRDRPIDVRRSVQAFVYETIKRRNLLDEL  
45 VAAGSDAHPEDVRSPYVRQILRVGTLEMKIWRNPPPAVTDCEMVRIAKRLVGSKAGA  
FVNAVLRGVERVSVKDVLEDRPWTERLALKYGHPEWFVLYVLDLFEGRSRVELLL  
RANNRVPPQYLRINRLKLDPLVAGDVLEREYGIVTEPTFLEEVRALVRGRGYGSRA  
WREGLFDVQDLASASASAALSAEPGETVLDVCAAPGSKTTHTAERMLDEGEVWAV  
50 DRSEWGLRVLERRCRRLGITCVRTICRDARGLTVDDLDPDVPDRILVDPPCSTTGWV  
NRNPDSRWKPKPLERFAERQWEILEPALRIAEHGGCTLVYSTCSVSWEENEAIKVR



ALEEFDVKLVDAGVLGSPGIEEFRGERFSGYKKVRRYWPF RHDTAGFFVAKMKGK  
G

5 <SEQ ID No.:1631;PRT;Methanopyrus kandleri>  
VEVIKVGGEVLDRVEDLARVIDDSILVHGGGPEVSDVMERMGLEPRFVRGLRVTD  
ETLQVMMVLAGLVNKRLLVAELRSEGINALGLSGVDGGLLIAEKRESEVVDGEEVDL  
GYVGDKRVNAELLESLLDAGYVPVAPLGAGEDGTVYNVNADTAAGAIAGAVRAD  
RLVLLTDVPGVLEDLDDPETLIERVPEDEVEELEEKGIVTGGMVPKLEAAKMAVEAG  
CREAVITNLEGLLEGRGTIVR

10 <SEQ ID No.:1632;PRT;Methanopyrus kandleri>  
MPRGRDHEPGRVARGEGNHREVA AHLGEKIEKYISKLP SVLNECKPRDRAGERLL  
DLASRYFYDARYFLDRGEMVEAFTCLSYAWALLRAGA EVGVLDVPEDEV

15 <SEQ ID No.:1633;PRT;Methanopyrus kandleri>  
LVRPVS VGKHGGVSVEVLHPSDLPPQLTSLCKIKINGARVISRRSNIVAFRGRPSLEP  
LNDLDGFMSIAARESEVVMVGDPYLRVLAVEEGERIVVNTDRLLACLD FETIELKND  
EITVVECVGPDIVVLACSSPVVASLKLEGDTAHVQAGSILCWWNIHTENVGDFLRLT  
GQGHVMLSITKKPDATEKGASTEKTAPRKVSSWI

20 <SEQ ID No.:1634;PRT;Methanopyrus kandleri>  
VRVFRVGGKGITPSPDCNCYLLAVGDEGILIDL GASGEVIDRLPGNV DVRYALLTHS  
HFDHAAAGPDALEAGLEVGVHRAEA EVLREGDDRLSAAYLFGRPMPAYEPSFTFR  
DGETFDVGGEVEVLYTPGHSPGSCCFLLGD LAFTGDTVFGFGPGRWDLP GGDR  
25 KKLCESLERLLSTGVR SIFPGHGYE VIGEAVPAIEAALREAEKDI

30 <SEQ ID No.:1635;PRT;Methanopyrus kandleri>  
MRPEELALKAVREALRRTVFDPAWTHVT VVSDDALHVHILTNQRKNVEGKGGRN  
RQYLEGYAEGYLA AHGHDVEVRVSVGAGLRDETEEF RYLPLKRALKEGVIEEGSP  
IHRVCERLGIGYVVLGAREIVGPNPALVEVVEGLEGERAVDVFTGTGT GALAAVEAG  
FEQVY AIDVRVHPEVRERLESEGVEIEADFRD VDLREFEPIDLLTADPPYASTLEFL  
EKLSEERPRVD TAVVCHGFSSWTRAVREIRGFLIELFEDVEPVSKYGHELSVCRRLL  
RD

35 <SEQ ID No.:1636;PRT;Methanopyrus kandleri>  
LVRSHAPIPNPVERIRALRVLREVHRRRKKPSLEV TYRTVNGSTCGPYVARWRR  
DPRHKHGR TLYLGKPENESVSFVEWLVS LDRREVLELARHLMRNLRSVLKTLTTEV  
SDLPYKKARWVLARGLALAFDARPS EPRIRDLEELPDRLESFAVRTLG GWPAPHY  
SSYLKVIHHRGKSLDEKHEVPDVGLEFQRWKLQRG

40 <SEQ ID No.:1637;PRT;Methanopyrus kandleri>  
LTSSFYGEPEGLRWLEDDLRLALGLSPVRYEYGDRDAVEVAVHSEGFAALLRGLGM  
PEGRKTGRVHPGLVRRGPDRVALEFLSGLFGADGWISAREN RVEVGIAQASPWG  
ESSEFLEGVSSLLKRTTG VYARVLEAGSYETSVDGRRSVFGLGFRGEHVERFLTRV  
45 PFEYSVRKRELGLWAGAYLRYRARGGKDAFERFVEERCLPGGLVLDRV DVERR

50 <SEQ ID No.:1638;PRT;Methanopyrus kandleri>  
LNPELILARLFGVLLGRGTFRDGRPRVRLSVPIGGASELLADLSRLGVNPSVR CGK  
RWTSVESRDGR LIGALIMAGASADPVDGIPNWVFEDPEAARELLSGLYSVRGRVLG  
FDGSRPRPVRLRLARADRELDLLSLALDVCRLLGSLNVDAEVVGLSHVSSGHYRY  
ARVEVLIRGRDLRRFLSEVEFRYNPEQSERARRMLRELARRETQLSTKWP ARWG  
DVGVS DSGDEGLVLRTELGF EIAGPADMWVSSRNKRRLGDLKPGDRV VLYPVGV

PAADRRGTLADVDAPGARRFLRDLPLRWEDPALPTLTRVLGYAIGDGHLEP  
DVVVLRGAGGTAVARGRSARARPLAGAVRVRG

5 <SEQ ID No.:1639;PRT;Methanopyrus kandleri>  
VGCPGLYLTKEEERILDGEEGELKAKLMEVLVKLGDFDAERLVRPASVHVSGVSY  
GTIGDAGLRFLRKVAEAGLRVSVPTSVNPGICLDGNLPVDEEFERKQREIMDALES  
LGVASVYTCVPYQQGFQPSRGDLLAWGESSAVFVANTYYGARANREGAPATVAAA  
VVGRIPYGMHLDENRVAEYEVVVEFEPRNDFEWSALGYLGEALDGIPVLKLPTV  
10 PLSNVKYMGAASGALAMAYIPGITPEEPRMDCPERIEVEREDVFDLVEERFGT  
EREGFAFTGCPHRPDGEIPRFDGCAICCPANATLDGYRLRGTCPVVAPIEDVHDVV  
FTDSLKAHYLASRVEVNVGPL

15 <SEQ ID No.:1640;PRT;Methanopyrus kandleri>  
VALEKLADLLDVRNENTRHSYRFALRRLDEFLLRILEDEEPEEWLEKAPDEEILEVA  
RELRLNLLVESVRNMELDHMGRLCWYALTKALRAVGRDPLLVLTVKAYGSPASPE  
MTEQDAREILELVDLIEEWAKENKDASWWAPFRIIAESGISVMDLVRMRWADVCPG  
EPWLEETPDEPRLRVEKPEETIEFPITERGLEALRELAEWAGVDPTEEPERFILMSE  
DDEYHTDAQRMDSWRARLTyrwREAQRsvLGESEWRIKDLTRATRILRLPELRR

20 <SEQ ID No.:1641;PRT;Methanopyrus kandleri>  
VSELNVVELFHGDLYSIAYRAELDKFLPMIGRARITPAELTLAGLLELGYEVEVTTLEG  
KSLPGRRIELADEVKGVVTGRYVEELDSDRVHHLRLSARCLGAEVKIRYSSDWK  
VEIGGYEVDPSKLHKNRALVKLEFVSTREPSFTDLVVDLGAAPGGWSSFAAQMAE  
NVVAVDPARLEDVRLENVHHLRITAHEFVLPPEMIGVGFPGEKVTLLSDVYSGNPE  
25 DDLYAVLRLRLERLENDVWGVKVAPEDDVLEWFMEEIEEAGFAVENVNLESASS  
NETFVYFRE

30 <SEQ ID No.:1642;PRT;Methanopyrus kandleri>  
LKRSPRDSVPYVTLDGSLIYEVVRPEFSRVNTVSLAVAEIPPGESTVPHYHLDFDEV  
YWVLEGRGIVHVGSRSLVHPEDCVEIPRGSVHWVENDGSETLRILCVCSPPYRHE  
TTVTLGSKRTSRSSSPTRD

35 <SEQ ID No.:1643;PRT;Methanopyrus kandleri>  
MIHGNRGALLPIPRIVLAGSSSACGKTMITAGIIQALRADGYEVQPFKVGPDYIDPSY  
HWLASGRPCGNLDTFLFREKHVRWLFEHRCEGADLWVEGVRLYEGIGAVGVRG  
STYHVSEVLNAPVVLIVDARSLTKSVAALVKGYAELEGANIAGVILNRIRSEVHYHKV  
RRALVKYTDVKVLGYVPRDRRLKVEYRHLGLVPTPERLEEMRERLRTVAEIVSEHV  
DLDALIDVAEAAGPLGGERPWEVNPTKCRIAVAKDEAFNFYYPENLEALEENGAKL  
LEFSPVRDEDVPPDADALYIGGGYPELFARQLEDAESTRNSIRELAESGAPIYAECC  
40 GFMVLCRELWNEDRYRWGVFDVAVEMTDVQGLSYTVARAVDDTPVTRKGET  
FKGHEFHYSRLVRPEGLESAYRIIRGQGWRGREGFRPKDLPNVLGTYVHVHAASH  
PTFATNFTGSTGS

45 <SEQ ID No.:1644;PRT;Methanopyrus kandleri>  
LEERDEGDYVVVKCRECGHVIVRRKVGSAGLTTETLGIAVAAAVTATAIASTLV

50 <SEQ ID No.:1645;PRT;Methanopyrus kandleri>  
MTVVFAPRFARRAPSRTRGSEAMEFDVVVGAGPAGSVAAWAAAEAGCDVLILER  
KAEIGVPKQCAEGISAHGLEHAGIEPQDEWIATEISRALIYAPNGKEFEVPGDGYVLE  
RRVFDKWLVRRAVEAGAEVELLAHARRALLDEGRVVGVEYEGEDGVHEVRARIVIA  
ADGIESRIGRTAGLVP SLKPVEMCTCAQYEMVGVDVEEDATHFFVDAEFFPGGYF  
WIFPKGEGRANVGLGIRGSESEPGDALKVLNRALEDHELISEAVADAVPVEVNVGG

VPVCGPVERTYGDGILLVGDAARQVNPLTGGGLHTSLVCGRIAGEVAEEAIEEDDT  
SASFLKRYQDRWEEEFGKTFKYALKASKIFSEMSNEELNALAEALDREDILRLVKGE  
EvvkvAKKVISRKPSLLKYAKHLMK

5 <SEQ ID No.:1646;PRT;Methanopyrus kandleri>  
VIDRLREALKRFNPCDSCLGRAFgyGLTGLENRERGRAIKLYLGMRAHLEGEETL  
ELLARSGLEEEAAVLDPPPEPEPCGVCRGVLDKvDEFaEVVACELKDLEFRGFVVG  
SRWPEEIRKAekELWETLGVEGEPIKREfNREVGKRVEHLLDVRADPRNPdIEVVF  
10 DFRPSLEDPKFEVHVRPIYVRGryLKLRRGIPQTKWPCPRCRGAGCPNCDFTGKLY  
TESVEELIGMVLKDAFLAESHKFHAAGREDIDVRMLGNGRPFVMELLYPKRRNVDL  
KEIEGEINRKVGDDVQVVGLEYGDPEDVGKvKDLSESRKRYRAWVKGKVPED  
KLREVLKGLERSVIEQRTPRRVLHRRADKVRrkRVHEAKLIEYDGDRAVIEFLCDPG  
LYVKELISGDAGRTRPSLAELVEVEAECErLDVIEFLDEGGDRS

15 <SEQ ID No.:1647;PRT;Methanopyrus kandleri>  
MPRIVSVKAREVLDSRGEPtVEVEVELEDGTVGRAMVPSGASTGTyeALELRDGD  
DRYGGKGVRRAVRNVeeIIApeIEGLDATAQPDIDRTMIELDGtENKSHLGANAILGV  
SLAVARAAAKSLGIPLyRYLGgPTARRLPVpFMNVINGGEHAGNELDFQEHMIVPH  
GFESFSEALRAGVETyHVLGELLEEEYGPIATNVGDEGGYAPPMKDTVEPLDVLVE  
20 AIEEAGYAPGKEIALALDAAASEFYDEDSGTyRAYGQKYTRDELIDVYKDLVSQYPIV  
SIEDPLHEEDFRGfAKITEELGDkvQIVGDDLfVTNPDRLRKGIEMGAANALLKvNQ  
IGTLTEAVEAGELALQHGYGVMVSHRSgDTEdPFIADLAVALGCGQIKTGAPARSS  
RTAKYNrLLRIEEDLAGAAEFGRNDFFLP

25 <SEQ ID No.:1648;PRT;Methanopyrus kandleri>  
MTGGKRGWNPASIDPRLYQRTGFLIVATLNLVIVGLVAAVGIKVIVEKHYPMVGAIAI  
PIVVAPLLLPLLYLLRVLKREKLvvVGEDRVLIIRGKDVTEVPVDEITGISVDFEFKRRR  
RKMIILTRSGHVELPFHskRLMRDLQRlleERRASEVDKetyARAGADRVATVLCK  
MVELGRSPVLHEAqGSVKAVWPgDSVELGREdGWAPRWMyWFLCVASLPVkaa  
30 KRSLREDPVDtVIAEEEAAGQSLASSFNkILRTGPiVSALLVFLAVVRGVLYKWGPk  
ALGVFLFTAAPWILATSVLSfLLNNRVKtVELHGVRAffSLVAMVSIFSGLGtCLHGS  
LAETAMLRKSLPPSAHLTAVIELVIAMVSLVPLVktLRWVDPRGAVRWCMALRATIR  
EDRVILFSVVFALLSVFFAGSAASPGLWWVTfPIATATPVLWTvyFLSWSKMAREVV  
SKVWIPESES

35 <SEQ ID No.:1649;PRT;Methanopyrus kandleri>  
LCGVSGCYLLKENEAGVYNYLILHANQHrgQESAGICVYDGLRLVGKKGMGLVTEV  
FDRPDLRKLsgPVGIGHVRYSTTGASELVNAQPFKVGYSKGELALAHNGDIVNSEE  
LRRELVSdGHAFVSETDSEVIARLLAVALTETDDMFEAFEDVMERLVGSYSltVITS  
40 HGDliAVRDPWgFRPLCLGWDERGFFVSSETVGLDVLGVEERRELERGEVvWIRE  
GDVESKvVRRERKAVCMFEfVYFARPDsIIeGRcVYECrKCMGKRlaEEAPVECDL  
VVPVPDSGRtAALGYAESLGVPMEeGLIKNRYVGRTfIMPEQEERvRSIRVKLNPIR  
EVIKGCsLAWDDsIVRGNTSRQIVeMLRDAGAREVHMRIASPPVvSPCYYGIDMAT  
KEELIAADLDVPEICEKISADSLAYLSLEGLVESIRLKKRELcVGCLTGEYPTVPPE

45 <SEQ ID No.:1650;PRT;Methanopyrus kandleri>  
VNRAREELDRYRETLEEVSsRFVDVATKARQRREDPKPEPEVMLATSIGERVEGLL  
QVENVADRLeeLEEEELGDREEATFRIVEEVIKELKvKGDPLHkRIDYAVRIGLAVL  
TEAVVSAPLEGIAAVEIRERGTGHRVvDESEPPHEEPKLvCTECGKEVDpENCYLA  
50 VKYAGPIRAAGGTAAALSALLADYARQVAGLPRFNPDdFDHDLVGRYVEEVtYLD  
KVGsFQYNPSEEEVELVAKNIPIEIDGEPTEEVEVQGHrDIPHLPNQLRGgALLVICE  
GICQKAPKLIKrVEKYGIDGWEFLEKLvNKGSdDEEEGEEEkTKIKPNdKYMGELVA

GRPLLSHPSAKGGFRLRYGRARNTGFAAVGVHPSLMYVTKGFIVIGTQLKVERPGK  
AACVLPVTEIEPPVVKLRDGSVVRLLDDPREAKELVEKDEIEEILDGEMLVAVGEFIE  
NNHPLVPPAYCPEWWVKEVPDVVKVIGLRKNLPNDVFEKLDVPLKRLVKEASRLS  
GNGNNLDGFLNGPVKVARSELVRKEVIPRLSSPERMSVEEAIELSREYGVPFHPK  
5 YTFWLWHDVKPKDVDELREALEVAGSEWGNLRVEFENDGEIKRILEDLLVPHRLEDD  
TIVVEEPWASALLAQLGYDPESGEFREQDELDYLLDYLVIRDETCRYVSKLAGFPI  
REKAPTRIGARMGRPEKARERKMSPPPHVLFPFIGIAGGNQRDIMKFHRGESEDTR  
VEVCYRICPECDRLVPYRVCPCFGTETVQYCNRCDEPADECDCEPDVVRADIER  
NDDPYSSLPVRELVRRAEEVGTDTLKGVKGMTSRLKMPEPLQKGILRAKRDLFV  
10 FKDGTLRFDCNDCPLTHVRLKEVGLTPFKARLLGFERDINGDPVSEDQVVELYPQ  
DVVLPKRAAEWAVRVCQYLLDLRKYYGLEPVYGVKEKPEDLIGHLIVTLAPHTSCGV  
VGRVVGADINCWYNHPIINAARRRNCDEDAFMLLLDVLLNFSRLYLPDKRGGLM  
DAPLVLTAVWDPYEIDDEVWNMDVCGDYPLELYRKALEYADAGEAEELIERLEDRLD  
LPRGLQFTHDTEAIDLGPVTRYSRLEKMEEKLEEQDLARRIRAVDESDVAKIVLDS  
15 HFLPDIKGNLRKFGRQKFRCSRCNAKFNPPLSGKCPRCGGDVLLTIYPATATKYLE  
PAKRLVEEFGTHDEEWRTIASEVELLEEAKTLFGSDHSVSLKKFFGET

<SEQ ID No.:1651;PRT;Methanopyrus kandleri>  
MRRELIERLESRLDRREIEKARRDSHARRRPRPCGITVHPGHGCPRACSYCIPEM  
20 GFRFERARPYRLSGEGMVLALLYNRGFEFGREGTFIAGSVTDPFLPELADKTLEYL  
RTFSRWLGNPTQFSTKSAIDGEVAESLARLELPLNGLVTILTPDREKASRLPRAPR  
PEERLETITELSKAGLTVDLFFRPILPGIVGLEEAEELFRMARDAGARGVVVGFRV  
NEGILSRLKRSDFDVSEIVNRANRPIPKGRKQVYVRTGDIKERLLRIAREVGLTPFGA  
ACCACASAAQVPCPNRCWEGPFCTECGNPACPV

<SEQ ID No.:1652;PRT;Methanopyrus kandleri>  
LRLYRRRDPEPQSPSSSEGGPLPLPSLALVPLISISALIVAALRGWGLFRASSLSLAL  
YLIASFTFPTVQVPYVRVVDLSALKGVEILAVVLASLTLVEMMREDGVLEDIVHILKET  
CQLRGPCLVGLSVVATGAFESVAFGTPATLVGPLLVEAGLSKTTAAAAALVGHAP  
30 FGVFAAFGVPIVLTSGVSGIDPKKLSFDVALCIAPSLVLPYAVAETADLRVSKVLLTT  
MGIMTTASLLAVWWWASPSIVGPLLVLGVASGFLWYLRVAGEEARIKVSNDTIKGM  
VYGLVVVGIGVVKALDVKWWQPWMLLWVAVLLYATPRWTRMVGALIRVLRKTWEE  
LLSIVLLMVLGTLIAHSELPSAIRPYAGSPLVTLVFGFMGEMVVGSTTAVMATFASGT  
PYPEITLAGAACAAAACPNVAVAAAVRCHEKRVMMRSLLGSMYLTVP TLAWCTM  
35 LWIWGAMK

<SEQ ID No.:1653;PRT;Methanopyrus kandleri>  
LKEFAVALHDKAPIYGLRIDNVVSYSSANGVEYLYELSDNELKLLQQYRRIGEVR  
40 GFRVCSELGLDTLIWIAGRDGSSYYELKRILLTENSTVRHVYVNVSPNYLVTDDPS  
LPGYFSVNCYWNGPDKIWYPYYLKLKGVEIVNVKDVPYPTYSSTIQLVSLVDILADAA  
LKALTKAVKHELVSQQPPEVKAESHLLSALEGPEPPSPSALEEVMRKGGASEEFIE  
SVLEGLRKYWSGSTGIGTSQRSPVNIITVLVTLWVRRRPPGGVARSARG

<SEQ ID No.:1654;PRT;Methanopyrus kandleri>  
MSNYVIRLENVRKVYNSGSVKVEALKGVSLGVKNGEFLMIVGPSGSGKSTLLHIMG  
45 ALDTPTSGRVEIAGKDMTNLSDEELAEIRNKYVGFVFQQYNLIESLTVLENVMFPMT  
LAGEEDEERAKDLLRKVGLKEEHFDKFPSQLSGGEQQRVAIARALANDPEVILADEP  
TGQLDTKNSQRIMKLEKLNDSGHTIVMVTHDLSLVRWADRVILLRDRGRIEREMSPE  
ELDAEVLD

50 <SEQ ID No.:1655;PRT;Methanopyrus kandleri>

- 5 LITIKVAIRNIARRSVRSLLTILGVAIGVAAVVGISAIKGLQHDVKVAISGSASLIVKSKA  
APDPLSSVLDESIEDEVKIPGVKRTVAVWFNNRMITVGRQRQPILIAAVENRGYEL  
VVGSKIEPIEGHLPKHGEMAFGSLIWRKLRPKVGETVDLSGQKLRVSGAFKTSSQLA  
NMCAITTLDSVNKIRGKSISCVFVQTSDBKRVKEIESRINGVEAITTSKAVQGMLNN  
LRTVELAAIALTGIAGVVGALGVANTMLMSVIERKREIGVMKAIGATNRDVMKLFLE  
SIIISLAGGIIGCVLGMGLGSQLLVHILSYIKHQTVSVLITPEVLGLGLALALAIGVVSGLY  
PAWKAACKVDPVEALRYE
- 10 <SEQ ID No.:1656;PRT;Methanopyrus kandleri>  
MITLDTETTVEDLSESDVEGRIIYAPCKGCSPEEVPQEVVRATVHRKGPDEKGVPR  
FVANVLARCESCGTVNPNVRLVIFYAPKKVKVTISRYEESECKEVEMDPLEEIEVGDVI  
EVEGERVEITNIATHEEDSVKKAKVKDVVSVWGVSLDIPARIGVSINLPSTYISEKV  
EVDREDEFTVGEIYELDGMLFRVHAIKPEGRPTVKREGESVKAEEIKRIYGRPVRRG  
TPKKSLESI
- 15 <SEQ ID No.:1657;PRT;Methanopyrus kandleri>  
MEITLKARGHENVTGRHRSTFEVTKDPEIGPTADCIIGVRADTACADLPEDFKMLMR  
RGARVEVILRAGGTEDRVVGVGHPRMTLQDGRSMVFRTSDYIDDRTVLIRCNKAAR  
DLSRDLVRALKDPETVLMVEMRVLVDVR
- 20 <SEQ ID No.:1658;PRT;Methanopyrus kandleri>  
MVEILYKQPKGKRAYEEYALILDFLPYGRAEPPHQRQPVAQAIGKDDFFVLLELAPKE  
GAFLELHEEVYVGRGKRDKIHHVNRRLRYDELATAREELPHAVEKIIDNEEDFVR  
FFNEARPITPRLHQLELLPGIGRKTLEERILEEREKEPFESLDDIKERVKGLRMHPRDM  
25 IKERVLAELKGETRDKYRLFVPEFRGGGRKRR
- <SEQ ID No.:1659;PRT;Methanopyrus kandleri>  
LPSISLQARERSPTNVHEARKVVEKVLKERDPELTVDQREAVRYLKKGFSLEPEDLE  
EAKEELRSILGDLTTNERTVEILVNKILEVQPRSEEEIKVLLESAGKRLLRRADEDVVR  
30 AILEVSERIAEEE
- <SEQ ID No.:1660;PRT;Methanopyrus kandleri>  
LVRRSKGFRSRTRKKLRKKPRERGLSPLGPMTQEFEEGQKVHIVIDPSVHKGMPPH  
RYHGRTGEVVGRQGRAYIVKIRDDGGKEKKLIVYPEHLKPQEQPELQ
- 35 <SEQ ID No.:1661;PRT;Methanopyrus kandleri>  
VVVVYHRPFSHFRVNHVALIAGNLGAKLLVYSEPKSRAALDGITQVLEHPEERGRV  
PVMVVDLDDALEVVDGRVALLDPSADEGIKKLKPSDVLLTVPVELLEEIDIEPDLT  
VVSAPVGELAAALAVVLYELGGA
- 40 <SEQ ID No.:1662;PRT;Methanopyrus kandleri>  
MYENISTMDDFEFENKWVLLRIDINSTVIDGKIEDDERIKRHLGTIKELMEHDARVAIL  
AHQGRPGEDDFTTLEPHAEIMSEELDNFEYVPDVFGPTAKKKIRSLEPGEVILLENV  
RFYSEERINRDPEWHARRHLVRNLAPLFDIFVNDFAAAHRSNASLVGFTRRLPSC  
45 VGRVMEREIEVLETMVRDEMEDGVFVIGGSKIEDAIKVIRRAIEMDNVRRVLLGGLV  
GNLFLWASGVDLGKPSRKFLDMKGYTGYLDEARELLEEGDDVILVPEDVALNRGGE  
REEVDVDELPAAPVFDIGTGTIERYRKEVESAGMVVANGPMGVYEEPGFEKGTYE  
VLNAIADSEAFSVIGGGHIIAAKACGAYDSIDHVSTGGGAMLRMLAGERLPAIDAILT  
CPFSGC
- 50 <SEQ ID No.:1663;PRT;Methanopyrus kandleri>

LDRIRKIMRREAIEVIEYACNNLPEEDVKKALDLVVEKIRNDRGIFIVGMGRTGLIGECF  
AVRLVQMGARCYVVGHSTERAIPDDLLIALSVSGNTAFVNYAADVAKDEGADVLA  
VTMNADSKIAEKADV VVLPEPEEIIIRTFSEMLMLSFLDGFTAQLAKELGVDES DM  
WERHAKIQ

5

<SEQ ID No.:1664;PRT;Methanopyrus kandleri>  
MLRVPPVIVNFKAYSEAVGENALRLARVAAEVSEETGVEVGICPPHVDLRD VVREV  
GDEVTVLAQAVDAAEPGGRTGHVTPEMVVEAGADGTLNHSERRMLLEDLKD VCR  
ACINEGLLTIVCASDALAARAAGALSPHAVAVEPPELIGTGTVPVSKADPEVVERSVEV  
10 VKEVSEETAVLCGAGITDGS DVRAAVELGADGVLVASGVLADDPKEALLDLISGLE

10

<SEQ ID No.:1665;PRT;Methanopyrus kandleri>  
LSGKRNAARKAAEEVCRRGYEVIGVGAGTTVEAFLEELVKREADVLVFTTIPGTIDA  
CRRIGLNVTTIPPEELPVAIDGADAVDPDGNLLKGGGACHSLEKAIDYTADEFWVVV  
15 DESKLVENLWELPVPVEVLRGCYELTVRTLEEFGEVRPRTCDEKYGPVSDSGNPI  
VDLHVDDWDPAELERELNSVPGVVECGVFP GDKVDRIIVGRS

15

<SEQ ID No.:1666;PRT;Methanopyrus kandleri>  
MSDKVLVIGAGPNRIGQGIEFDYCTVHAVWAIQEEGYKAIIVNNNPETVSTDYDTSD  
20 KLYFEPITLEDVLNIVEKERPIGVLTQFGGQTSVNLTVPLAERGVRVLGTD PDDVDRL  
EDRDRFSKLLKKGIPQPESGTANDPEEA VEVAEDIGYPVLVRPSYVIGGRAMEIVY  
DEEDLRRYIEEAAKVSPEHPILIDRFIEGGIECEIDGARDEAGNVLIPGIMEHIEEAGVH  
SGDSACVPPQTLPEHAQETVLEYAEDIAEGANVIGLINIQFVYDPEEDEVYVIEANP  
RASRTVPFISKAVGIPLAKIGTKAILGREIPEVLDEMGLEPPDGDPGIVAVKEAVFSFE  
25 KWPGVDPVLGPEMKATGEVMGIDRTFGAAYWKAQLAAGHELPLEGTAVISVADRD  
KPDIVPIARKLQRLGFDLLATRG TASHLREHGIECEVVRKVSEGSPNIVDLIREGEIDL  
IINTPTGKDAARRDGYAIRRAAVKFKVPYITTIAAKAAVEAIELVKEKGVTVNCLHDIH  
KGDWTPREVKPEELTRYGG

25

<SEQ ID No.:1667;PRT;Methanopyrus kandleri>  
30 LIVLATSEGVKLGRRLAEELDAELAPVEEDRFPDGEQIVRVPPELDGT VVVVHSMSP  
PQDENLVKAIITLDAARENGAEEVIAIVPYMAYSRQDRRFEPGEPVSFR AVARAVSA  
NADALITVDLHEPGTLKYFDVPAENVSAAEELGKYLAERFEGEDLVVIGPDEGAREL  
AREVASICGVEYDHLEKKRLSGDEVEIHPKELDVEGRTVVLVDDMIDTGGTMVEAA  
35 RALRDQGAGTLYAACHTALLTRNAATRLLASGFEDIIATDTPNPFEKVSVAPPVAE  
AVENLSG

35

<SEQ ID No.:1668;PRT;Methanopyrus kandleri>  
40 LTELQVG DYARYVRTGTVGVVDVKEREDGRWQLDSTGLYYHEDYVEKVEKKES  
KEKEETDIEE VVERIRELKEAFEHVDERVCEGGG

40

<SEQ ID No.:1669;PRT;Methanopyrus kandleri>  
MRVSELLQRHVITNRG HDLGTVM EVELAWKDKCIKALLVQPSKEYAQQVKADVVEV  
PWSSVLAVGKYVLVDESKIRPRR

45

<SEQ ID No.:1670;PRT;Methanopyrus kandleri>  
VMAGGRAKRMGGVEKP AVEVAGKPLLWVLEALQDCCCVD RITVAVSRDAGVTRS  
IAERLGAEVVTPGDGYVHDLRFALESVGTPALT V TADLPCLTPDIVGLVIAAWA AVP  
EPSLSVWVPRSLIVKAGLSLWRRFESTVGNVRVAVVGLNVVGG LRKTDEFKLLLDE  
50 PRLAYNVNTWHD LRKVEGVL RSCPREERAQGLQALKTR

50

<SEQ ID No.:1671;PRT;Methanopyrus kandleri>

VIRVEFLKVFRFLTVLPIGEHPKSPREIGEQA WLGLPAVGLVSGLLAGVVAWAFAGT  
PVRGCLVVLTLVLLEGAQHFDGLVDVGDALMAGVISEEGATKAMRDPRVGVGGLAI  
GSMALLAVASFGWIPFEVLVPIEVFSRFTVLPMAAVGEPAPASYSGRVFTEYVDAD  
QVLLGGILSTVVS LPPFSPVATLTCAVCSAVVAWTCLEAARTIRGVNGDFLGASIWV  
5 SRVLSAVCLSSLPW

<SEQ ID No.:1672;PRT;Methanopyrus kandleri>

VEFFHVIKDERAVVLEFENPVKYVSSAFYS DGVGEVRWVANIRVEKGWSHDDPWG  
YVEERLHELGLEPEDTLAFLTAADVEQA AIVQKGDVFAVATAGFGNAYCSKTKEHDL  
10 GPGGTVNVI AVVGRPLTTRSLVEALTWAVEAKCHGVL RIVLGN EGPCLGTTTDSVA  
VLCPOGDELDSFCGPATELGRR LMSAVEEAVVTAGERAGYSPTRSIKTILEEEGIEL  
NDLVEAGRELFVGEWKEEHASRVLEELER GLENPNVALAVFTALLIDRFVRLGTYPE  
ECGELREDPGWVYFDEV LGQFVAMELGGYGALFNFKRYDEEKP GILKEVDERWV  
MLDDVLAGLVAGAMTA AFRRG

<SEQ ID No.:1673;PRT;Methanopyrus kandleri>

VAEAERPAGKEYTTISEVSGPLMVVEGVEGAKYGEVVEVETPTGEVRRGQVLEAR  
RDAVVQVFEGTSGLDTTSTKVRFTGETLRIPVSTDLLGRILNGRGEPI DGGPEIVPE  
DELDIHGAPINPAARKYPSDFIQTGISAIDGMNTLV RGQKLPIFSGSGLPHNELAAQIA  
20 RQATVPGEEEEF AVVFAAMGITHEEAAFFRREFEETGALDRAVLILNLADDP SMERII  
TPRIALTVAEYLAFENDMHVLVILTDMTNYCFAPGTRVITASGDVVEIDEIVERAAETA  
VDGGLREGSTEVTVGVTNVRTLAAWDGDLTSNDVVAVEKIEAPSR A VRVTRSGA  
ELVVS EDHKFLVD TEDGPRMVEASELKS GDELYSVREL RVSEKVPTYLELLLEAEDK  
FYVHPTEEFEEA VAERYGSLAEACREKELPYRAREAKERRYELSEFARLATAVIES  
25 VDEATEYIDYV TAGGRKRVKFSSPRPGKEVMYVAGLIASDGSVDTERGFVMFSNTE  
RELLSAFEIIVTE EFGVDASKTENQNGVTMLRVNSRVLARVFERLADPKTVLKMPR  
ELVAAYLAGYVDGDGHLKDGKIVITTADRERAGDLQ LLLKRLGVPSVL RERD GAYDV  
VVTGHDAELAEELPLRHPKKA EAAA SMSSGRSSRFDRVSRRFGRLLREVRKY  
GVRASDLGSSSTISQIESGERRATRR LALEIVERLEE VVG DVVEE VRELRELAEGNYV  
30 LDEVVEVETVEYEHEYLVDVTVDPDHTLV ENGIITSNCEALREISAAREEVPGRRG  
YPGYMYTDLATIERAGCIRGRKGSITQMPILTMPHDDITHPIPDLTGYITEGQIVLSR  
DLHRRGIYPPIDVLP SLSRLMDEGIGKGKTREDHPDLSNQLYAAYA EGRDLRDLVAV  
VGEEALTERDRKFLKFADEF EQRFVKQGRDENRSIEETLDLGWELLAILPERELKRV  
SDELIEKYHPKYRQKKEEQEE

<SEQ ID No.:1674;PRT;Methanopyrus kandleri>

VTQEILEDVNPTRMELLKLQDRIELAKKG HKLLKEKRDALIMEFFEMVKRASEIREQA  
VKKLMEAYSKLAAAKVTVGEIGVERASMATGEEIKVDVGS RNVMGVVPIIERS SED  
GGSKVYGFADTSGALDEAMRAFTEAIDAVLELAEIEETLRLMAEEIERTKRRVNL  
40 EHIVIPRL ENTEKYIEMKLDEQERENFVRLKRVKDLIERKKLKEELERVVEEGAELPS  
FE

<SEQ ID No.:1675;PRT;Methanopyrus kandleri>

MVFVSVAKRKVTERVRRRREP YDFKTD MFEGRFEPLIAAEDVTVEEGEDVIKVEPI  
45 EIPPHTMVLLSPYARNPYGHVLAVAE EFPKMMELGRKVEQVYFAAVRHGRIRKGDV  
LGVLLIELKGEE

<SEQ ID No.:1676;PRT;Methanopyrus kandleri>

MRDESRLDKYVIKEILRINRHLPRRRKTLEELLREERPHV VNRDGTKHYFDRDELER  
50 LADILPRYLHGRLKLPILIELGYSGAAVIRGKA EVRVVCEVLGEEWRFSQDRVELNML  
DVRKLRREFPTATQYMFSTEYIMGRPKVERRG



<SEQ ID No.:1677;PRT;Methanopyrus kandleri>  
MAVELPKAAIERIFRQGIGERRLSQDAKDTIYDFVPTMAEYVANAAKSVLDASGKKT  
LMEHLKALADVLMVEGVEDYDGEFGGRATVRRILKRAKIERASSDAVDLYNKLICR  
ATEELGEKAAEYADEDGRKTVQGEDVEKAITYSMPKGGEL

5 <SEQ ID No.:1678;PRT;Methanopyrus kandleri>  
MPAWRRVNWVNFLEERREYQVSVAAEILDSMDNTLVVIPTGLGKTAIGVMVLSELVDE  
GRAVFLAPTVPVLVNHARFIERATRGLDVKALTGRVRPERRKVEWKSDVIVATPH  
VIRNDIIEGRIDPDEASVVFDEAHRAVGGYPYVVSKEFNCLKVGLTASPGSDVKRI  
10 KEVVQNLGIERIIVKTEEDPDVKKYLGRVKVEWVDVELPEWFDNARRELQRAFERR  
LELLEDMGFLQSSRNWVGKLLSLREEIREQMAKRRERASWCSRALGVVAEALRIA  
RAREILETQGIEPFLRYVERLTERKRSSGGSSLRRLGDPNFQRAVRECKSASLRDE  
PDHPKLPEVEELVKDVESALVFTQYVDTAKLIADYLKEIGISVGVLLGKEHMKEHEQL  
DVIKSIKRGECRVLVSTSVGEEGLDPTCEEVLYEVPSEIRTIQIRIGRTARDGAVG  
15 NAHVLVARGSFPTLDEIYFHVARRREKKMLEAVMRVQEWLRKRKGKTTATSKNLRK  
LRSRAKTLQFVGGGRSKRERDEVRRPPSRAPVIVDSRELNTKVVEHLRRKPVVLE  
RDTLELADYVVGEGVGVERKSESDFARSLLDGRLLMDQAREMTREFDRAVIVEGNP  
RREIEPEAVD GALATLAVDFGISVLQSAGPEETAELLYRMAKRFEERQRPRPRKRR  
STEDLRVEMLSICIPGVGPELARLLDEFGSIGDVVNASPSELKRVKGIGERKAREIR  
20 RFLWS

<SEQ ID No.:1679;PRT;Methanopyrus kandleri>  
LRLILTGPPGSGKTCFARELARELRQEGWRVAHVEADALRGFLWDEFDPKLEQVA  
RELFLKSVETCLDAELDLVIADDTNYYSSMRRELALLALERKVPWGIVYLRTGLDTCL  
25 RRNRERGEPIPEEVVRRRIYDRFEPPEPDRWWRATLVLDSSRVSEEVLEFVESGLR  
VEKPKKRRRTDPSSVNEVDVTRQVMGELMRRLSETGAATQELGRKLSELREI  
VSSVEDPEKAVREFRRRAEEVIRECLHGDG

<SEQ ID No.:1680;PRT;Methanopyrus kandleri>  
30 MGISEKLGLSKGQRYVFFGGKGGVKTCAAATAVWLSEEEGKEVLVSTDPAHLS  
LSDIFDQNIQSEPTPIEGVEGLKAIEIDPEKAAEEYVEVMKRVYEMSKDKGMEDLFG  
GEDLLKEQEELLKSSPGIDEAAAFQKFMELMKDDSYDVIVFDAPTGHTRFLSVPE  
TLERQVKTMIVRRRTLQVSKMLKTLIPFADSDDEDEDEILENLEKMKKEIEEIRETLS  
DASLTAFRLVMTPEEMAIYEARRALRTLNHYEIPVDMVIVNKMVMPKRADECEFCRTR  
35 RKMEERLKLVEKYFGDKEIHQIPMFAEEVRGLGKIRQVAEILYGEPA

<SEQ ID No.:1681;PRT;Methanopyrus kandleri>  
LVRKPKKFPKRRYELHAHTYLTGELLPAEFLRRRAEELKHEALVFTEHVDPSNLEDA  
VSRLAEACDALRGYYRTEPVPGAELTHVPPDLIPELAEAEARDNGARVVLVHGETPA  
40 EPVKPGTNEVAASCDVAVLHAPGLIDLETARMASENGVALEITTKRGHCLANGWV  
VRVALETDELVLNDAHLPGDLLKPEEAATAAMGAGLPEKMLKWVLEEVPRKILKK  
R

<SEQ ID No.:1682;PRT;Methanopyrus kandleri>  
45 VAPKSMKHIRNNVWVWELPEDYKGCMKVPGRITYATEKLIDGMEKGVFDQVANVACL  
PGIYGYSIALPDAHGYGFPIGGVAAFDVEEGVVSPGGVGYDINCLAPGKILTEHG  
CWVKVEDLPKMLTDQKLKVYDVDEGREDDSEIKFVMERGIEEDERAVVLVTESGLTI  
EGSEDHVPLTPEGYVELGEIEEGDLVVYPFEGVEYEEKEGTILDESDFEDVDPQVL  
RYLEERDLIPLRWSDPKVGTARILGFAMGDGHLGEQAGRLTSLFYGDERTLRELK  
50 RDLES LGVKANLHVRKRRYEIETASGRYEGEATSVELRVASRSFALLMEKLGMPRG  
RKVETPYKVPDWIKEAPLWVKRNFLAGLFAADGSVVKFKRYTLPINLTQAKVEELE  
ENLREFMNDVAKLLREFGIETTLYEVKSKKNVYKLAIVGEENIKRFLGKVGYEYDPE

KKVEGLAAYAYLKLKERVKKDRKEAAETA AEVYEETGSITKAHEAVADVNNRRFVE  
RVVYDGGISSVRVPEDFPTFERFKEERVLAGGFVIEEVVEVKGVEPEYDRFYDIGVC  
HGAHNFIADGVVHNCGVVRVMTDLTEDDVRPKLRELLETIFRNVPAAGLSRHRRV  
RLSTQELRQVMLYGAEWAVEEGFGFDEDLDHIESRGNMTHAYETIGWEEYGPRDD  
5 VASKRAIERGRPQLGTLGSGNHFLVQVDEIYDKEAAEKMGIREEGQVTIMVHTG  
SRGFGHQVCSDHLRIMERSMRDVERRFGVRIPDRQLACAAMGTDEAKRYFNAMN  
AAANYAFANRQMISHWTRESFVEVFGDEYGDADDMGIEVIYDIAHNMAKIEKHPVD  
GEERWLWVHRKGATRAFSEEALKKHGEPVPFEGLPQPVLIPGDMGTGSYLIGTEK  
10 AMEETWGSTCHGAGRTMSRAAAKRKFWGEDVARELERQGILVKAASMPVVAEEA  
PPAYKDVDEVRAVAEAGISDPVVRRLRPIGVVKG

<SEQ ID No.:1683;PRT;Methanopyrus kandleri>  
MRVEVDPEVNDRGLRYAYVRVEGVDPGADASELVDRVTARLRERFDLDDLKDDPI  
VRAYRDYLSIDVDPTKVRPAGEALLRRALRGNFPRINAVVDSYNLASAEYRVPISC  
15 FDADKLTGDLIRPAESGEVMVDIAGERMELDDRFRVVADEDGPVSVSPYRDARRT  
AVTDETERVLLLAHGVPGVEVEHLVEALKTAVRYLREGAEAESASRIVTP

<SEQ ID No.:1684;PRT;Methanopyrus kandleri>  
VEGTRQRVIFYGLLSRVYERSPLSLPKHLVKEILRDLKGCCRVLDVGCATGYLTRKLA  
20 AVCDRVVGVGINRKMVEASQSRNRLPNVKFVRADAHNLPFPDACFDGIVLSEILQHL  
DVIRALKEVDRVAARGCRMVVLDPDTSRAARVATRLIHVFTGNNAWVSPGTVVGI  
MRDMDWKLVRVFSAGKRVLITMEKRGAGDAGRSGPGG

<SEQ ID No.:1685;PRT;Methanopyrus kandleri>  
25 VIKRILPCTVLAMIVCTAVGLQPAHSEKAPVPKPPKLEEKKEEEKKEEKERKESTLKP  
GKYKVAEADFKNGVVYLKPLYKPKVIPVKVPPRVIRKLRP GTVVEVHQRGSSSTVIR  
TASGTAEGSTVITRTESSSGTMGHTTSSSEALQTGSTSSSTSTPSHTSVGTSAGAG  
TYGNTTVNAKEKTVSSEGGKTAGSSKSKESKKGKREKKEKNRSSKEKIKVKRPKSSG  
SSDLELQREASSGSSSGWAPYLVAIALVGAATGGMWLVKQRRSTTWWE

30 <SEQ ID No.:1686;PRT;Methanopyrus kandleri>  
MFEGTGFGWVEYGGERYNHDIYVTEGKVHRREKGLSRSKFGTSHNLADELRRRL  
LELCDEEPEVIVGTGQSGVLSVTEEAREFCEERGIELVEAPTPEAIERYNELKDKG  
KKVAAVIHTTC

35 <SEQ ID No.:1687;PRT;Methanopyrus kandleri>  
MTAFEVRDLRVYYGEEEEALKGITLDIPEKKITTIIGPSGCGKSTFLRCLNLMIKEIPYAR  
TEGEVIFDGENVLEYEDEADIIAHHRRRVGTVFQHPNPFPMWSIYDNVAYGLRLMGM  
DEDEIEDRVYEALEKAALLDQVEDRLDDPASALSGGQQQLCIARALAMRPEVLLM  
40 DEPTSDLDPIATRKIEETVMELKGEVTIVFVTHLLPQAYRIGDYTAFFLHGELVEANST  
EKLFTDPQDERTKEYIEVEFGPS

<SEQ ID No.:1688;PRT;Methanopyrus kandleri>  
MREVAAKQAQESENLIKSATAAAISIAAVIGIYLFLLNGVKALQYDSVIDILFGTVW  
45 RPDSYPPRLGLLPMIISTLYVTIADVIAFPISLLCATYLAEFAPRILRRTLPAIDMLAGI  
PSVYGLFGILTLPFAREYLGAPTGYSVLVAGIIVAIMILPYMTSVMMEAMRAVPRE  
YVEAALGMGATRWQVVRTVLWPAARSGITAGGMLGTLRAMGETVAVALVAGAAL  
MIPTSPLDPCRPLSAHILLQATVLPVGSPPGYALYFGGLVLMMLMTGVIVLAYRYRR  
RTGRIRVRKRKSHHARLNPVIVSKLMTGLMVLGAVIAAALVGITGYIFANGVGALS  
50 WNILFGPINIGDPVHSSLYPALLGTLALMFYSTVFAALIGIPTALYLAEFAGDTAFTRA  
VRFAIDTLAGVPSIVYGLFGATLFFVYMKMGYSVLGALTLAVMNLPMVMVRTAEAEAF  
RSVPREYVEAARGMGASWFHVVRDVLLPMAKPGITAGITLSMCRAAEAAPIILTAV

MIGLISTNPFVHVLQPTDALAFRIYLIAKEYLMEPGARATAFAAATVLVAVTLGLNLLAI  
YMRDKFERKIGRRG

<SEQ ID No.:1689;PRT;Methanopyrus kandleri>

5 N/A

<SEQ ID No.:1690;PRT;Methanopyrus kandleri>

10 VGGELKKYLIAAVVAIAVIAGGAAYYYSTAGAVKTQLRIGGSTSLMPFMMKVAAYVG  
EEHRMTWKQIGEQVGVQGLPDEPVQLMVSDGGSSAGIKGLIEGTFDIAMASRPLKP  
EEAQQLSDPVMCPVVLSAIVPIVNGKTLGQLDDIDPKTLRDIYTGKIKYWDQVKPGLP  
HKKIVVIGRAKGSSTRSTFDKYLNIQDYTKDAILCGSNSEVLEKVEKTPYAIGYVDYA  
YVVKAKKGGKVPKSAVKPLKVNGVEANEQTIIAKKYPLVRAEYLIIDRSNAPKTAIALIK  
WIRKPDVNKEFAEKVGYVPVPEDAPLFSKKPYIEIKPLVK

15 <SEQ ID No.:1691;PRT;Methanopyrus kandleri>

LRQCRICGIPETVDGVELDESGVCACRRQIRHIPSRLKELREKVRKALENSEKVLVA  
VSGGLDSLALGLALRICDEVVALTVDTGALHPEAWRRILARRMSGIEWEIIIGDQKP  
FLKLFEERLTRAESPCGPCSRMITRRYERRARELGVDIVTGHELPHGTSPVVPKDP  
PVIRAMCGMTENERREIVVEEFGLTVDKISGYTSNCIVLPFALKLFYMKYGYSFAPR  
20 LAAMVRYGYISREDMEQIMTPPTLSDLKELLRECEEWIPESLKQMLQKVINKISNSDL  
GRENGD

<SEQ ID No.:1692;PRT;Methanopyrus kandleri>

25 LELLRKKVSGKKICVLISGGMDSAVATKILQLSNTDVRGLHITHRWMWFTPEIEIKRIS  
KMLGIKIDVVDITDELRRRLRGAKGKSVCKICKKIMLEIAVSKASVVATGECGMDTIA  
GAVLDVSRRTGIEPEFVQLPKRYFNGDDRIIVRPLIRIHESDVKRLARLLGVKVRVVG  
ETGDLRRGRREGCPQLHLDPWVDVTDLMDEVWDVNVEALLVARRLGRRVSVKW  
PSFRIILEGSPEERRHVAECVWYRWVRAGRPRRYR

30

## ATTACHMENT C

## Functional Classes

- 5 INFORMATION STORAGE AND PROCESSING  
 [J] Translation, ribosomal structure and biogenesis  
 [A] RNA processing and modification  
 [K] Transcription  
 [L] Replication, recombination and repair  
 [B] Chromatin structure and dynamics
- 10 CELLULAR PROCESSES AND SIGNALING  
 [D] Cell cycle control, cell division, chromosome partitioning  
 [Y] Nuclear structure  
 [V] Defense mechanisms  
 15 [T] Signal transduction mechanisms  
 [M] Cell wall/membrane/envelope biogenesis  
 [N] Cell motility  
 [Z] Cytoskeleton  
 [W] Extracellular structures  
 20 [U] Intracellular trafficking, secretion, and vesicular transport  
 [O] Posttranslational modification, protein turnover, chaperones
- METABOLISM  
 [C] Energy production and conversion  
 25 [G] Carbohydrate transport and metabolism  
 [E] Amino acid transport and metabolism  
 [F] Nucleotide transport and metabolism  
 [H] Coenzyme transport and metabolism  
 [I] Lipid transport and metabolism  
 30 [P] Inorganic ion transport and metabolism  
 [Q] Secondary metabolites biosynthesis, transport and catabolism
- POORLY CHARACTERIZED  
 [R] General function prediction only  
 35 [S] Function unknown

TABLE 1

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0001	748	1806	-	352	RCL1	RNA 3'-terminal phosphate cyclase	COG0430	[A]
0002	1888	2403	-	171	lbpA	Molecular chaperone (small heat shock protein)	COG0071	[O]
0003	2357	3415	-	352		Predicted GTPase	COG1084	[R]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0004	3490	3807	+	105	RPP1A	Ribosomal protein L12E/L44/L45/RPP1/RPP2	COG2058	[J]
0005	3811	5343	-	510		Replication factor C (ATPase involved in DNA replication)	COG0470	[L]
0006	5349	7256	-	635		Replication factor C (ATPase involved in DNA replication) intein containing	COG0470 & COG1372	[L][L]
0007	7315	8682	-	455	TIP49	DNA helicase TIP49, TBP-interacting protein	COG1224	[K]
0008	8796	9161	+	121	DsrE	Uncharacterized conserved protein involved in intracellular sulfur reduction	COG1553	[P]
0009	9299	10450	+	383		Uncharacterized protein specific for M.kandleri, MK-36 family		
0010	10400	11074	-	224		Predicted dinucleotide-utilizing enzyme of the ThiF/HesA family	COG4015	[R]
0011	11167	12018	+	283	Mtd	F420 dependent N5,N10-methylenetetrahydromethanopterin dehydrogenase	COG1927	[C]
0012	11999	12547	-	182		Uncharacterized protein conserved in archaea	COG4016	[S]
0013	12672	13748	+	358	Hmd	H2-forming N5,N10-methylenetetrahydromethanopterin dehydrogenase	COG4074	[C]
0014	13791	14549	+	252		Uncharacterized protein conserved in archaea	COG4017	[S]
0015	14518	15279	+	253		Uncharacterized conserved protein	COG0327	[S]
0016	15236	16306	+	356		Biotin synthase and related enzymes	COG0502	[H]
0017	16252	17787	+	511		Uncharacterized protein conserved in archaea, FLPA ortholog	COG4018	[S]
0018	17781	18263	+	160		Uncharacterized protein conserved in archaea	COG4019	[S]
0019	18347	19369	+	340		Collagenase and related proteases	COG0826	[O]
0020	19326	19685	+	119		Predicted metal-binding protein		
0021	20108	20878	-	256	Pnp	5'-methylthioadenosine phosphorylase	COG0005	[F]
0022	20875	21456	-	193	Cmk	Cytidylate kinase	COG1102	[F]
0023	21460	21801	-	113	RPL34A	Ribosomal protein L34E	COG2174	[J]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0024	21809	22345	-	178		Predicted membrane protein	COG1422	[S]
0025	22359	22934	-	191	AdkA	Archaeal adenylate kinase	COG2019	[F]
0026	22954	24330	-	458	SecY	Preprotein translocase subunit SecY	COG0201	[U]
0027	24397	24861	-	154	RplO	Ribosomal protein L15	COG0200	[J]
0028	24876	25325	-	149	RpmD	Ribosomal protein L30/L7E	COG1841	[J]
0029	25473	26153	-	226	RpsE	Ribosomal protein S5	COG0098	[J]
0030	26170	26778	-	202	RplR	Ribosomal protein L18	COG0256	[J]
0031	26782	27231	-	149	RPL19A	Ribosomal protein L19E	COG2147	[J]
0032	27295	27900	-	201		C4-type Zn finger	COG1779	[R]
0033	27917	28900	-	327		2-phosphoglycerate kinase & Predicted small molecule binding protein (contains 3H domain)	COG2074 & COG1827	[G][R]
0034	28904	29251	-	115		Uncharacterized conserved protein	COG2450	[S]
0035	29245	30336	-	363		Uncharacterized conserved protein	COG3367	[S]
0036	30390	30980	-	196		GTPase SAR1 and related small G proteins	COG1100	[R]
0037	31183	31749	+	188		Predicted hydrolase of HD superfamily	COG1896	[R]
0038	31721	32782	+	353	PelA	Predicted RNA-binding protein pelota	COG1537	[R]
0039	33253	34011	-	252		RecA-superfamily ATPase implicated in signal transduction	COG0467	[T]
0040	34081	35229	+	382		Uncharacterized conserved protein	COG1602	[S]
0041	35263	37083	+	606		Uncharacterized conserved protein	COG1542	[S]
0042	37451	38404	-	317		Uncharacterized protein		
0043	38495	39829	-	444		tRNA and rRNA cytosine-C5-methylases	COG0144	[J]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0044	40642	41649	-	335		Fe-S oxidoreductase similar to Oxygen-independent coproporphyrinogen III oxidase (like hemN)	COG1242	[R]
0045	41815	42918	+	367		Predicted GTPase of the YlqF family	COG1161	[R]
0046	43093	43638	+	181		SAM-dependent methyltransferase	COG0500	[QR]
0047	43671	44753	-	360		Pyruvate-formate lyase-activating enzyme	COG1180	[O]
0048	44786	45367	+	193		Uncharacterized conserved protein	COG1590	[S]
0049	45367	49032	+	1221	RgyB	Reverse gyrase, subunit B	COG1110	[L]
0050	49029	49949	+	306		Uncharacterized protein		
0051	49918	50835	-	305		Predicted ATPase of the PP-loop superfamily implicated in cell cycle control	COG0037	[D]
0052	50862	51494	+	210	GlpG	Predicted membrane serine protease of the Rhomboid superfamily	COG0705	[R]
0053	51991	53284	+	431	AmtB	Ammonia permease	COG0004	[P]
0054	53306	53659	+	117		Nitrogen regulatory protein PII	COG0347	[E]
0055	53735	54652	-	305		Fe-S oxidoreductase	COG0731	[C]
0056	55284	55847	-	187		Uncharacterized protein conserved in archaea	COG1772	[S]
0057	55840	56433	-	197		Uncharacterized conserved protein	COG1628	[S]
0058	56430	56768	-	112	RPB11	DNA-directed RNA polymerase, subunit L	COG1761	[K]
0059	56784	57464	-	226		Uncharacterized protein conserved in archaea	COG3286	[S]
0060	57457	58047	-	196		Predicted RNA-binding protein (consists of S1 domain and a Zn-ribbon domain)	COG1096	[J]
0061	58044	59066	-	340	RecJ	Single-stranded DNA-specific exonuclease	COG0608	[L]
0062	59083	59697	-	204		Predicted RNA methylase	COG2263	[J]
0063	59694	59882	-	62		Zn-ribbon containing protein		
0064	59908	60720	+	270		Uncharacterized protein		



SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0065	60717	61094	-	125		Uncharacterized conserved protein	COG 4744	[S]
0066	61097	61705	-	202	TolQ	Biopolymer transport proteins	COG 0811	[U]
0067	61681	62895	-	404		Predicted transporter	COG 4827	[R]
0068	62910	63524	-	204		Uncharacterized protein		
0069	63592	63867	-	91		Uncharacterized protein		
0070	63864	65960	-	698		Superfamily I DNA/RNA helicase	COG 1112	[L]
0071	66184	66945	+	253		ATP-utilizing enzymes of the PP-loop superfamily	COG 1606	[R]
0072	66957	68126	-	389		Uncharacterized protein specific for M.kandleri, MK-21 family		
0073	68133	69011	-	292	NadA	Quinolinate synthase	COG 0379	[H]
0074	69027	69896	-	289		Predicted metal-dependent hydrolase of the urease superfamily	COG 1831	[R]
0075	69998	70933	+	311		Uncharacterized protein		
0076	70930	71757	+	275		Uncharacterized domain specific for M.kandleri, MK-33 family		
0077	71931	73088	+	385		Predicted GTPase or GTP-binding protein	COG 1341	[R]
0078	73121	74119	+	332		Predicted carbohydrate kinase of the FGGY family	COG 4020	[S]
0079	74116	74928	+	270	TyrA <sub>1</sub>	Prephenate dehydratase	COG 0077	[E]
0080	74941	75492	+	183	PorG <sub>1</sub>	Pyruvate:ferredoxin oxidoreductase, gamma subunit	COG 1014	[C]
0081	75485	75754	+	89	PorD	Pyruvate:ferredoxin oxidoreductase, delta subunit	COG 1144	[C]
0082	75767	76918	+	383	PorA <sub>1</sub>	Pyruvate:ferredoxin oxidoreductase, alpha subunit	COG 0674	[C]
0083	76931	77821	+	296	PorB <sub>1</sub>	Pyruvate:ferredoxin oxidoreductase, beta subunit	COG 1013	[C]
0084	77794	78321	+	175		Fe-S-cluster-containing hydrogenase component	COG 1142	[C]
0085	78242	79153	+	303	TtdA	Tartrate dehydratase alpha subunit/Fumarate hydratase class I, N-terminal domain	COG 1951	[C]
0086	79158	79691	+	177	FumA	Tartrate dehydratase beta subunit/Fumarate hydratase class I, C-terminal domain	COG 1838	[C]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0087	79695	80291	+	198	purO	Archaeal IMP cyclohydrolase	COG3363	[F]
0088	80293	82308	-	671		Predicted RNA-binding protein homologous to eukaryotic snRNP	COG1293	[K]
0089	82341	83522	-	393		FOG: CBS domain	COG0517	[R]
0090	83620	83895	+	91		Uncharacterized membrane protein, conserved in archaea		
0091	83902	85701	+	599		Predicted ATPase, RNase L inhibitor (RLI) homolog	COG1245	[R]
0092	86099	86650	-	183		Predicted phosphoesterase	COG0622	[R]
0093	86682	87470	-	262		Uncharacterized conserved protein	COG4021	[S]
0094	87467	88255	-	262		Predicted dinucleotide-utilizing enzyme	COG1712	[R]
0095	88185	88820	-	211		Uncharacterized conserved protein	COG2428	[S]
0096	88832	89203	-	123		Uncharacterized conserved protein	COG1873	[S]
0097	89216	90763	+	515		Predicted carbamoyl transferase, NodU family	COG2192	[O]
0098	90768	91475	+	235	RibD	2,5-diamino-6-ribosylamino-4(3H)-pyrimidinone 5'-phosphate reductase, riboflavin biosynthesis	COG1985	[H]
0099	91472	91828	+	118		Zn-ribbon-containing protein		
0100	91983	93164	+	393		Uncharacterized protein specific for M.kandleri, MK-36 family		
0101	93378	93962	+	194	Tmk	Thymidylate kinase	COG0125	[F]
0102	93969	94385	+	138		Holliday junction resolvase, archaeal type	COG1591	[L]
0103	94354	95916	-	520	AsnB	Asparagine synthase (glutamine-hydrolyzing)	COG0367	[E]
0104	95989	98838	+	949		Uncharacterized protein specific for M.kandleri, MK-40 family		
0105	98775	99845	-	356		Diverged homolog of ATP-dependent DNA ligase (eukaryotic ligase III)		
0106	99868	101157	-	429	ThiC	Thiamine biosynthesis protein ThiC	COG0422	[H]
0107	101154	102512	-	452		Predicted diverged member of adenylate cyclase 3 family		
0108	102514	103230	-	238		Uncharacterized protein conserved in archaea		

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0109	103269	104672	+	467	Lys C	Aspartokinase	COG 0527	[E]
0110	104669	105400	+	243		Uncharacterized protein		
0111	105387	107522	-	711		Superfamily II helicase	COG 1204	[R]
0112	107561	108058	+	165	Paa Y	Carbonic anhydrases/acetyltransferases, isoleucine patch superfamily	COG 0663	[R]
0113	108066	109103	-	345		Predicted sugar kinase of the RNaseH/HSP70 fold	COG 1548	[KG]
0114	109078	110001	-	307		Predicted ATP-utilizing enzymes of the ATP-grasp superfamily	COG 1821	[R]
0115	110027	111160	+	377		Uncharacterized conserved protein	COG 1944	[S]
0116	111223	112113	-	296	Ftr <sub>1</sub>	Formylmethanofuran:tetrahydromethanopterin formyltransferase	COG 2037	[C]
0117	112165	113037	-	290	Aro E	Shikimate 5-dehydrogenase	COG 0169	[E]
0118	113009	113827	-	272		Calcineurin superfamily phosphatase (nuclease) with Zn-cluster	COG 0622	[R]
0119	113841	114335	-	164	Ubi C	4-hydroxybenzoate synthetase (chorismate lyase)	COG 3161	[H]
0120	114352	115302	-	316		Uncharacterized archaeal coiled-coil protein	COG 1340	[S]
0121	115299	115952	-	217	Ser B	Phosphoserine phosphatase	COG 0560	[E]
0122	115928	117214	-	428	GlyA	Glycine/serine hydroxymethyltransferase	COG 0112	[E]
0123	117235	117816	+	193		Uncharacterized protein		
0124	117823	118356	+	177		Ferredoxin domain containing protein	COG 4739	[S]
0125	118374	118637	+	87		Zn-ribbon containing protein		
0126	118826	120259	+	477		Kef-type K <sup>+</sup> transport systems (NAD-binding component fused to domain related to exopolyphosphatase)	COG 1226 & COG 0618	[P][R]
0127	120262	122115	-	617	Glm S	glucosamine-fructose-6-phosphate aminotransferase	COG 0449	[M]
0128	122121	123176	-	351		Acetylornithine deacetylase/Succinyl-diaminopimelate desuccinylase and related deacylases	COG 0624	[E]

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0129	123173	125095	-	640	GatE	Archaeal Glu-tRNA <sup>Gln</sup> amidotransferase subunit E (contains GAD domain)	COG 2511	[J]
0130	125187	125582	+	131	Ada	Methylated DNA-protein cysteine methyltransferase	COG 0350	[L]
0131	125594	126139	+	181		Uncharacterized conserved protein	COG 2029	[S]
0132	126133	127611	+	492	FrdB/GlpC	Succinate dehydrogenase/fumarate reductase Fe-S protein	COG 0479 & COG 0247	[C][C]
0133	127591	128607	-	338	TruB	Pseudouridine synthase of the TruB family	COG 0130	[J]
0134	128665	134793	-	2042		Cobalamin biosynthesis protein CobN and related Mg-chelatases	COG 1429	[H]
0135	134868	136871	-	667		Terpene cyclase/mutase family protein		
0136	137011	137391	-	126		Predicted transcriptional regulator	COG 0640	[K]
0137	137551	138318	-	255		Uncharacterized conserved protein	COG 2106	[S]
0138	138349	139011	+	220	ComB	2-phosphosulfolactate phosphatase	COG 2045	[HR]
0139	139012	139761	+	249		Uncharacterized conserved protein, PrgY homolog (pheromone shutdown protein)	COG 1916	[S]
0140	139843	140517	+	224		Uncharacterized protein conserved in archaea	COG 1810	[S]
0141	140548	141339	-	263		Predicted permease	COG 0730	[R]
0142	141415	141891	+	158		Universal stress protein UspA and related nucleotide-binding proteins	COG 0589	[T]
0143	141888	142646	-	252		Predicted permease	COG 0730	[R]
0144	142704	143494	-	263		Predicted ATPase of the PP-loop superfamily implicated in cell cycle control	COG 0037	[D]
0145	143437	143949	+	170		Uncharacterized conserved protein	COG 2410	[S]
0146	143918	146485	-	855		Predicted P-loop ATPase fused to an acetyltransferase	COG 1444	[R]
0147	146611	147321	+	236		Uncharacterized protein conserved in archaea		
0148	147400	148779	-	459		Selenocysteine-specific translation elongation factor	COG 3276	[J]

SEQ ID NO.	Start	Stop	Status	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0149	148789	149439	-	216		Uncharacterized membrane protein		
0150	149446	150267	-	273		Uncharacterized protein conserved in archaea	COG 4022	[S]
0151	150225	150746	+	173		Uncharacterized conserved protein	COG 1720	[S]
0152	150700	152415	-	571	GRS1	Glycyl-tRNA synthetase, class II	COG 0423	[J]
0153	152432	153412	-	326	SgbH	3-hexulose-6-phosphate synthase	COG 0269	[G]
0154	153397	154548	-	383	TRM11	N2,N2-dimethylguanosine tRNA methyltransferase	COG 1867	[J]
0155	154583	154855	-	90		Ribosomal protein L35AE/L33A	COG 2451	[J]
0156	154883	156067	+	394		Predicted pyridoxal-phosphate-dependent enzyme apparently involved in regulation of cell wall biogenesis	COG 0399	[M]
0157	156089	158347	+	752		Archaea-specific RecJ-like exonuclease, contains DnaJ-type Zn finger domain	COG 1107	[L]
0158	158344	158832	-	162	SrtA	Sortase (surface protein transpeptidase)	COG 3764	[M]
0159	158829	159656	-	275		Predicted membrane protein		
0160	159680	160726	-	348		Uncharacterized protein conserved in archaea	COG 1627	[S]
0161	160771	161502	-	243	PssA	Phosphatidylserine synthase	COG 1183	[I]
0162	161509	162153	-	214	Psd	Phosphatidylserine decarboxylase	COG 0688	[I]
0163	162159	162707	-	182		SAM-dependent methyltransferase	COG 0500	[QR]
0164	162731	163357	+	208		GTPase SAR1 and related small G proteins	COG 1100	[R]
0165	163354	163716	+	120		Uncharacterized protein conserved in archaea	COG 3365	[S]
0166	163730	163984	+	84		Zn-ribbon containing protein	COG 3364	[R]
0167	163989	164609	+	206		Uncharacterized protein conserved in archaea		
0168	164625	165806	+	393	MreB	Actin-like ATPase involved in cell morphogenesis	COG 1077	[D]
0169	165843	166553	+	236		Histidinol phosphatase and related hydrolases of the PHP family	COG 1387	[ER]

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0170	166637	167686	+	349		tRNA and rRNA cytosine-C5-methylases	COG0144	[J]
0171	167695	168651	+	318	HtpX	Zn-dependent protease with chaperone function	COG0501	[O]
0172	168617	169261	-	214		Predicted metal-dependent hydrolase		
0173	169255	170073	-	272	HisF	Imidazoleglycerol-phosphate synthase	COG0107	[E]
0174	170173	170856	+	227		Uncharacterized conserved protein	COG2454	[S]
0175	170934	171410	+	158	TroR	Mn-dependent transcriptional regulator	COG1321	[K]
0176	171517	171996	+	159		Uncharacterized protein		
0177	172421	172690	+	89		Predicted membrane protein		
0178	172865	174169	-	434		Coenzyme F420-reducing hydrogenase, alpha subunit	COG3259	[C]
0179	174173	175090	-	305		Coenzyme F420-reducing hydrogenase, gamma subunit	COG1941	[C]
0180	175215	175787	+	190	CbiM	Cobalamin biosynthesis protein CbiM	COG0310	[P]
0181	175784	176476	+	230	CbiQ	ABC-type cobalt transport system, permease component	COG0619	[P]
0182	176505	177311	+	268	CbiO	ABC-type cobalt transport system, ATPase component	COG1122	[P]
0183	177298	177972	+	224		Protein similar to creatinine amidohydrolase	COG1402	[R]
0184	177969	178136	+	55		Uncharacterized protein		
0185	178176	178400	+	74		Uncharacterized protein		
0186	178822	179454	+	210	RnhB	Ribonuclease HII	COG0164	[L]
0187	179476	180135	+	219		Pyruvate-formate lyase-activating enzyme	COG1180	[O]
0188	180142	181521	+	459	Tgt	Queuine/archaeosine tRNA-ribosyltransferase	COG0343	[J]
0189	181481	182362	+	293	TRM1_2	N2,N2-dimethylguanosine tRNA methyltransferase	COG1867	[J]
0190	182418	184016	+	532		Uncharacterized protein conserved in archaea	COG1892	[S]
0191	184291	185067	-	258		Uncharacterized protein		

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0192	185064	187520	-	818	ChlI/ChlD	Mg-chelatase subunit ChlI and ChlD (MoxR-like ATPase and vWF domain) similar to subunits of a Ni-chelatase for the biosynthesis of the Ni-containing coenzyme F430, which is essential for the production of methane in methanogens	COG 1239 & COG 1240	[H][H]
0193	187517	188218	-	233	Nth_1	Predicted EndoIII-related endonuclease	COG 0177	[L]
0194	188360	189619	-	419		HD superfamily phosphohydrolase	COG 1078	[R]
0195	189564	190313	-	249		Uncharacterized conserved protein	COG 2457	[S]
0196	190289	191185	-	298	CitG_1	Triphosphoribosyl-dephospho-CoA synthetase	COG 1767	[H]
0197	191179	191640	-	153	PgpB	Membrane-associated phospholipid phosphatase	COG 0671	[I]
0198	191625	192632	-	335	HemB	Delta-aminolevulinic acid dehydratase	COG 0113	[H]
0199	192583	193491	+	302		Uncharacterized protein		
0200	193462	194676	-	404	HemA	Glutamyl-tRNA reductase	COG 0373	[H]
0201	194763	195011	+	82		Uncharacterized protein		
0202	195008	195703	-	231	Mra1	Uncharacterized conserved protein	COG 1756	[S]
0203	195719	196417	+	232		Predicted hydrolase of the HAD superfamily	COG 0561	[R]
0204	196414	197445	+	343	RecJ_1	Single-stranded DNA-specific exonuclease	COG 0608	[L]
0205	197414	199021	-	535	PyrG	CTP synthase (UTP-ammonia lyase)	COG 0504	[F]
0206	199348	200073	+	241		Uncharacterized protein conserved in archaea	COG 2122	[S]
0207	200076	200687	-	203		Predicted GTPase of the YihA family	COG 0218	[R]
0208	200743	200916	-	57		Preprotein translocase subunit Sec61beta	COG 4023	[U]
0209	201121	201396	+	91		Uncharacterized protein		
0210	201559	202800	-	413		Diverged homolog of ATP-dependent DNA ligase (eukaryotic ligase III)		
0211	202797	203468	-	223		Uncharacterized protein conserved in archaea	COG 4024	[S]



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0212	203539	204414	-	291		Uncharacterized membrane protein, conserved in archaea	COG4025	[S]
0213	204416	205297	-	293		Predicted hydrolase of the metallo-beta-lactamase superfamily	COG2248	[R]
0214	205420	205839	-	139		Predicted metal-dependent protease of the PAD1/JAB1 superfamily	COG1310	[R]
0215	205772	206662	-	296		Predicted membrane protein		
0216	206731	207078	+	115		Predicted regulator of Ras-like GTPase activity, member of the Roadblock/LC7/MglB family	COG2018	[R]
0217	207252	207995	+	247		Uncharacterized protein		
0218	207997	208806	+	269		ATPase involved in chromosome partitioning	COG0455	[D]
0219	208803	209303	-	166		Predicted RNA-binding protein containing PUA domain	COG2016	[J]
0220	209340	209561	+	73	LSM1	Small nuclear ribonucleoprotein (snRNP) homolog	COG1958	[K]
0221	209582	209770	+	62	RPL37A	Ribosomal protein L37E	COG2126	[J]
0222	209784	210659	+	291		TOPRIM-domain-containing protein, potential nuclease	COG4026	[R]
0223	210649	211632	+	327	PepP	Xaa-Pro aminopeptidase	COG0006	[E]
0224	211590	212726	+	378	CobT	NaMN:DMB phosphoribosyltransferase	COG2038	[H]
0225	212723	213457	-	244		Uncharacterized membrane protein specific for M.kandleri, MK-4 family		
0226	213461	214513	-	350	HypD	Hydrogenase maturation factor	COG0409	[O]
0227	214461	214739	-	92	HypC	Hydrogenase maturation factor	COG0298	[O]
0228	214814	215236	+	140		Uncharacterized conserved protein	COG1371	[S]
0229	215254	216432	+	392		Archaea-specific pyridoxal phosphate-dependent enzyme	COG1103	[R]
0230	216609	217232	+	207		Predicted RNA methylase		
0231	217222	217764	-	180		Predicted transcriptional regulator	COG1318	[K]
0232	217843	218598	+	251		Predicted metal-dependent hydrolase of the TIM-barrel fold	COG1099	[R]
0233	218648	219319	+	223		Predicted dinucleotide-binding enzyme	COG2085	[R]

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0234	219392	220681	+	429	UbiD	Predicted decarboxylase related 3-polyprenyl-4-hydroxybenzoate decarboxylase	COG0043	[H]
0235	220673	221713	-	346	PurA	Adenylosuccinate synthase	COG0104	[F]
0236	221605	223494	-	629		Uncharacterized protein		
0237	223440	225296	-	618		Uncharacterized secreted protein		
0238	225321	226688	+	455	GatA	Asp-tRNA <sup>Asn</sup> /Glu-tRNA <sup>Gln</sup> amidotransferase A subunit	COG0154	[J]
0239	227527	227967	+	146		Predicted SAM-dependent methyltransferase	COG0500	[QR]
0240	228106	228978	-	290		ATPase involved in chromosome partitioning	COG0489	[D]
0241	229171	230037	-	288		Uncharacterized membrane protein, conserved in archaea		
0242	230076	231260	+	394		Predicted membrane protein		
0243	231242	232369	-	375		Fe-S oxidoreductase, related to NifB/MoaA family	COG1625	[C]
0244	232648	234678	-	676		Distinct Superfamily II helicase family with a unique C-terminal domain including a metal-binding cysteine cluster	COG1205	[R]
0245	234728	235990	+	420	CysH	3'-phosphoadenosine 5'-phosphosulfate sulfotransferase (PAPS reductase)/FAD synthetase fused to uncharacterized archaeal protein	COG4027 & COG0175	[S][E][H]
0246	236115	236423	-	102	RpsJ	Ribosomal protein S10	COG0051	[J]
0247	236467	237738	-	423		Translation elongation factor EF-1 $\alpha$ (GTPase)	COG5256	[J]
0248	237821	238774	-	317		Predicted dehydrogenase	COG0673	[R]
0249	238965	240974	-	669	HdrA_1	Heterodisulfide reductase, subunit A	COG1148	[C]
0250	241089	241838	-	249		Uncharacterized protein		
0251	241914	242435	+	173	RplP	Ribosomal protein L16/L10E	COG0197	[J]
0252	242469	244781	+	770	PpsA	Phosphoenolpyruvate synthase/pyruvate phosphate dikinase	COG0574	[G]

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0253	244787	245512	+	241		Predicted transcriptional regulator	COG1378	[K]
0254	245475	245990	-	171		Predicted HD superfamily hydrolase	COG1418	[R]
0255	246012	246296	-	94	EFB1	Translation elongation factor EF-1beta	COG2092	[J]
0256	246301	246495	-	64		Predicted Zn-ribbon-containing RNA-binding protein with a function in translation	COG2888	[J]
0257	246666	246899	-	77		Predicted redox protein, regulator of disulfide bond formation	COG0425	[O]
0258	247069	248334	+	421	HgdB	Benzoyl-CoA reductase/2-hydroxyglutaryl-CoA dehydratase subunit, BcrC/BadD/HgdB	COG1775	[E]
0259	248342	249646	-	434	FwdB_1	Formylmethanofuran dehydrogenase subunit B	COG1029	[C]
0260	249749	250504	-	251		Activator of 2-hydroxyglutaryl-CoA dehydratase, contains a HSP70-class ATPase domain	COG1924	[I]
0261	250695	251156	+	153		Uncharacterized membrane protein, conserved in archaea		
0262	251171	251644	+	157		Predicted transporter component	COG2391	[R]
0263	251649	252227	+	192		Uncharacterized protein conserved in archaea		
0264	252347	253048	+	233		Predicted sugar kinase	COG0063	[G]
0265	253054	255024	-	656	HdrA_2	Heterodisulfide reductase, subunit A, polyferredoxin	COG1148	[C]
0266	255031	256479	-	482		Coenzyme F420-reducing hydrogenase, alpha subunit	COG3259	[C]
0267	256476	257390	-	304		Coenzyme F420-reducing hydrogenase, gamma subunit	COG1941	[C]
0268	257387	257812	-	141	FlpD_1	Coenzyme F420-reducing hydrogenase, delta subunit	COG1908	[C]
0269	257952	259379	+	475		Predicted membrane protein		
0270	259341	259781	-	146		Uncharacterized conserved protein	COG1617	[S]
0271	260022	261596	+	524	PheS	Phenylalanyl-tRNA synthetase alpha subunit	COG0016	[J]
0272	261597	262133	-	178		Uncharacterized protein		
0273	262262	262552	+	96		Uncharacterized conserved protein	COG1872	[S]

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0274	263009	263827	+	272		Uncharacterized protein		
0275	263828	265357	-	509		Isopropylmalate/homocitrate/citramalate synthase homolog	COG0119	[E]
0276	265405	266217	-	270		Predicted P-loop ATPase/GTPase	COG4028	[R]
0277	266246	266977	+	243		Predicted Fe-S oxidoreductase	COG5014	[R]
0278	266967	268979	+	670		Predicted membrane protein, family MK-41 family		
0279	269014	271053	+	679		Predicted membrane protein, family MK-41 family		
0280	271207	272499	-	430	HemL	Glutamate-1-semialdehyde aminotransferase	COG0001	[H]
0281	272912	273337	-	141	RibH	Riboflavin synthase beta-chain	COG0054	[H]
0282	273412	274092	+	226	Pcm	Protein-L-isoaspartate carboxylmethyltransferase	COG2518	[O]
0283	274537	274878	+	113		Uncharacterized protein conserved in archaea	COG4043	[S]
0284	275404	276174	-	256		Metal-dependent hydrolases of the beta-lactamase superfamily I	COG1235	[R]
0285	276198	277166	-	322		Uncharacterized protein conserved in archaea	COG4079	[S]
0286	277208	278248	-	346		Pyruvate-formate lyase-activating enzyme	COG1180	[O]
0287	278245	278508	-	87	PaaD	Predicted metal-sulfur cluster biosynthetic enzyme (MinD N-terminal domain family)	COG2151	[R]
0288	278515	278901	-	128		Flavodoxins	COG0716	[C]
0289	278976	280052	-	358	RgyA	Reverse gyrase, subunit A	COG1110	[L]
0290	280321	280542	+	73		Uncharacterized protein		
0291	280561	281142	-	193	DCD-DUT	Deoxycytidine deaminase/diphosphatase	COG0717	[F]
0292	281158	282030	+	290		Predicted phosphohydrolase	COG1409	[R]
0293	282024	282554	-	176		Uncharacterized conserved protein	COG1641	[S]
0294	282582	283844	+	420		Uncharacterized membrane protein	COG3174	[S]
0295	283841	285190	-	449		tRNA/rRNA cytosine-C5-methylase	COG0144	[J]

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0296	285197	285631	-	144		Predicted diguamylate cyclase, diverged member of the GGDEF superfamily		
0297	285628	287196	-	522		Phosphoglycerate dehydrogenase and related dehydrogenases	COG 0111	[E]
0298	287326	287943	-	205		Uncharacterized protein specific for M.kandleri, MK-1 family		
0299	288089	289126	-	345		Uncharacterized secreted protein specific for M.kandleri, MK-3 family		
0300	289372	290193	-	273		Uncharacterized protein		
0301	290810	291202	+	130		Predicted RNA-binding protein containing PIN domain, a fragment		
0302	291417	292477	+	353		Predicted RNA-binding protein containing PIN domain, a fragment		
0303	292704	293645	+	313		Predicted cysteine protease of the transglutaminase-like superfamily	COG 1305	[E]
0304	293608	294210	+	200		Uncharacterized protein		
0305	294271	295311	+	346		Uncharacterized protein		
0306	295669	296193	+	174		Uncharacterized protein		
0307	296467	297540	+	357	Fwd F_1	Probable formylmethanofuran dehydrogenase subunit F, ferredoxin containing	COG 1145	[C]
0308	297654	298370	-	238		Uncharacterized protein		
0309	298367	299332	-	321		ATPase involved in chromosome partitioning	COG 1192	[D]
0310	299623	300867	-	414		Orphan DOD family homing endonuclease	COG 1372	[L]
0311	302118	302261	-	47		Uncharacterized protein		
0312	302397	303113	+	238		Uncharacterized protein specific for M.kandleri, MK-42 family		
0313	303210	303731	+	173		Uncharacterized protein specific for M.kandleri, MK-22 family		
0314	304168	305175	+	335	Foc A	Transporter of the formate/nitrite transporter family	COG 2116	[P]
0315	306790	307817	+	342		Predicted hydrolase of the metallo-beta-lactamase superfamily, a fragment	COG 0595	[R]
0316	307991	308224	+	77		Uncharacterized protein		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0317	309026	309403	-	125		Adenine-specific DNA methylase containing a Zn-ribbon	COG1743	[L]
0318	309400	310002	-	200		Adenine-specific DNA methylase containing a Zn-ribbon	COG1743	[L]
0319	310314	310514	-	66		Phosphoglycerate dehydrogenase and related dehydrogenases	COG0111	[E]
0320	310502	311260	-	252	SerA	Phosphoglycerate dehydrogenase and related dehydrogenases	COG0111	[E]
0321	311717	313774	+	685	FdhA	Selenocysteine-containing anaerobic formate dehydrogenase, subunit alpha	COG0243	[C]
0322	313780	314913	+	377		Coenzyme F420-reducing hydrogenase, beta subunit	COG1035	[C]
0323	315226	315678	+	150	Fwd_F2	Probable formylmethanofuran dehydrogenase subunit F, ferredoxin containing	COG1145	[C]
0324	315855	316253	-	132		Fragment of predicted dehydrogenase related to phosphoglycerate dehydrogenase		
0325	316385	316765	-	126		Uncharacterized protein specific for M.kandleri, MK-1 family		
0326	316791	318491	+	566		Uncharacterized protein specific for M.kandleri, MK-5 family		
0327	318525	319349	+	274		Predicted membrane protein		
0328	319527	320099	+	190		Predicted membrane protein		
0329	320696	321142	+	148		Predicted membrane protein		
0330	321611	322570	-	319		Uncharacterized secreted protein specific for M.kandleri, MK-30 family		
0331	323201	323818	+	205		Uncharacterized protein specific for M.kandleri, MK-1 family		
0332	324061	324486	-	141		Uncharacterized protein conserved in archaea	COG4029	[S]
0333	324530	325426	+	298	ThrB	Homoserine kinase	COG0083	[E]
0334	325541	326770	-	409	CbiD	Cobalamin biosynthesis protein CbiD	COG1903	[H]
0335	326767	327753	-	328	GCN3	Translation initiation factor eIF-2B alpha subunit	COG0182	[J]
0336	327856	328425	+	189		Uncharacterized protein		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0337	328419	329402	-	327		Predicted transcriptional regulator consisting of wHTH DNA-binding domain and an uncharacterized domain conserved in archaea	COG1693	[S]
0338	329455	330930	-	491	GlnA	Glutamine synthetase	COG0174	[E]
0339	330946	332115	+	389		Predicted membrane protein		
0340	332123	333190	-	355		Predicted Fe-S oxidoreductase	COG1244	[R]
0341	333200	333739	+	179	SEN2_1	tRNA splicing endonuclease	COG1676	[J]
0342	333753	333998	+	81		Predicted transcriptional regulator containing DNA-binding HTH domain		
0343	334027	335151	+	374	TrpS	Tryptophanyl-tRNA synthetase	COG0180	[J]
0344	335153	336226	+	357		Predicted 23S rRNA methylase containing THUMP domain	COG1818 & COG0293	[R][J]
0345	336446	336976	+	176		Uncharacterized protein		
0346	336954	337934	+	326		Uncharacterized protein conserved in archaea	COG4030	[S]
0347	337941	339344	-	467		Predicted ABC-type ATPase	COG3044	[R]
0348	339352	339930	-	192		Uncharacterized protein		
0349	339944	340672	-	242		Uncharacterized protein		
0350	340738	340962	+	74		Uncharacterized protein conserved in archaea	COG1531	[S]
0351	340922	341869	-	315		Predicted DNA-binding protein containing a Zn-ribbon	COG1571	[R]
0352	341898	342389	+	163		Uncharacterized protein		
0353	342379	343095	-	238		Uncharacterized domain conserved in archaea fused to a metal-binding domain	COG4031	[R]
0354	343122	343445	+	107		Uncharacterized protein		
0355	343442	344674	-	410	HMG1	Hydroxymethylglutaryl-CoA reductase	COG1257	[I]
0356	345316	345639	-	107		Predicted membrane protein		



SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0357	345630	346286	-	218		Peroxiredoxin, predicted regulator of disulfide bond formation	COG 0425 & COG 2044	[O][R]
0358	346686	347828	-	380		Ferredoxin fused to an uncharacterized conserved domain	COG 1900 & COG 1146	[S][C]
0359	348126	348380	-	84	GatC	Asp-tRNA <sup>Asn</sup> /Glu-tRNA <sup>Gln</sup> amidotransferase C subunit	COG 0721	[J]
0360	348428	349369	-	313	AmpS	Leucyl aminopeptidase (aminopeptidase T)	COG 2309	[E]
0361	349585	350058	-	157		Archaeal riboflavin synthase	COG 1731	[H]
0362	350055	351050	-	331		Predicted metal-binding protein, conserved in archaea		
0363	351081	352025	+	314	GuaA_1	PP-ATPase subunit of GMP synthase	COG 0519	[F]
0364	352038	352766	+	242	HisA	Phosphoribosylformimino-5-aminoimidazole carboxamide ribonucleotide (ProFAR) isomerase	COG 0106	[E]
0365	352763	353614	-	283	HisG	ATP phosphoribosyltransferase	COG 0040	[E]
0366	353673	354968	+	431		Predicted metal-dependent hydrolase related to cytosine deaminase	COG 0402	[FR]
0367	355449	356759	-	436		Uncharacterized protein conserved in archaea		
0368	356998	358272	+	424		S-adenosylhomocysteine hydrolase	COG 0499	[H]
0369	358478	358597	+	39		Uncharacterized protein		
0370	359581	360552	+	323		tRNA/rRNA cytosine-C5-methylase	COG 0144	[J]
0371	360613	361065	+	150		Uncharacterized protein		
0372	361116	362186	-	356	MurG	UDP-N-acetylglucosamine:LPS N-acetylglucosamine transferase	COG 0707	[M]
0373	362211	363419	+	402		Predicted GTPase, probable translation factor	COG 0012	[J]
0374	363447	363887	+	146		Uncharacterized protein		
0375	364113	364475	-	120	GimC	Prefoldin, chaperonin cofactor	COG 1382	[O]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0376	364476	364727	-	83		Uncharacterized protein conserved in archaea	COG2892	[S]
0377	364743	365321	-	192	IMP4	Predicted exosome subunit containing the IMP4 domain present in small nuclear ribonucleoprotein	COG2136	[J]
0378	365318	365473	-	51	RPC10	DNA-directed RNA polymerase subunit RPC10 (contains C4-type Zn-finger)	COG1996	[K]
0379	365476	365745	-	89	RPL43A	Ribosomal protein L37AE/L43A	COG1997	[J]
0380	365802	366605	-	267		Predicted exosome subunit, predicted exoribonuclease related to RNase PH	COG2123	[J]
0381	366607	367326	-	239	Rph	Predicted exosome subunit, RNase PH	COG0689	[J]
0382	367335	368054	-	239	RRP4	Predicted exosome subunit, RNA-binding protein Rrp4 (contain S1 domain and KH domain)	COG1097	[J]
0383	368062	369129	-	355		Predicted hydrolase related to cellulase M	COG1363	[G]
0384	369130	369852	-	240		Predicted exosome subunit	COG1500	[J]
0385	369855	370595	-	246	HsIV1	Protease subunit of the proteasome	COG0638	[O]
0386	370595	371089	-	164	POP5	Predicted exosome subunit, RNase P subunit P14	COG1369	[J]
0387	371086	371820	-	244	RPP30	Ribonuclease P subunit Rpp30	COG1603	[J]
0388	371817	372278	-	153		Predicted exosome subunit	COG1325	[J]
0389	372312	372905	-	197	RPL15A	Ribosomal protein L15E	COG1632	[J]
0390	372970	373710	-	246		Predicted HD-superfamily hydrolase	COG3481	[R]
0391	373774	375273	+	499		Isopropylmalate synthase	COG0119	[E]
0392	375270	376295	-	341	ComC	L-sulfolactate dehydrogenase	COG2055	[C]
0393	376299	376865	-	188	ComE	Sulfolpyruvate decarboxylase, beta subunit	COG0028	[EH]
0394	376933	377703	+	256	ComA	(2R)-phospho-3-sulfolactate synthase (PSL synthase)	COG1809	[S]
0395	377707	378210	+	167	ComD	Sulfolpyruvate decarboxylase, alpha subunit	COG4032	[R]
0396	378195	379127	-	310		SAM-dependent methyltransferase	COG0500	[QR]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0397	379182	379682	-	166	SEN22	tRNA splicing endonuclease	COG1676	[J]
0398	379633	379872	-	79		Ribosomal protein S4 and related proteins	COG0522	[J]
0399	379869	380348	-	159		Uncharacterized protein conserved in archaea	COG1931	[S]
0400	380305	380895	-	196	CoaE	Dephospho-CoA kinase	COG0237	[H]
0401	380949	382022	-	357		Uncharacterized conserved protein	COG1415	[S]
0402	382222	383223	+	333		Predicted RNA-binding protein containing THUMP domain	COG1818	[R]
0403	383306	384133	+	275	TrpA	Tryptophan synthase alpha chain	COG0159	[E]
0404	385121	386080	-	319	ECM271	Ca2+/Na+ antiporter	COG0530	[P]
0405	386095	386403	+	102		Zn-ribbon-containing protein		
0406	386375	386872	+	165	MobA	Molybdopterin-guanine dinucleotide biosynthesis protein A	COG0746	[H]
0407	386862	388859	-	665		Uncharacterized protein conserved in archaea	COG2433	[S]
0408	388923	389306	+	127		Uncharacterized membrane protein/domain	COG1714	[S]
0409	389293	389832	-	179		Predicted intracellular protease/amidase	COG0693	[R]
0410	389846	390271	+	141		Uncharacterized protein conserved in archaea	COG4081	[S]
0411	390268	390561	+	97		Uncharacterized protein conserved in archaea	COG4033	[S]
0412	390558	391289	-	243	RplB	Ribosomal protein L2	COG0090	[J]
0413	391302	391589	-	95	RplW	Ribosomal protein L23	COG0089	[J]
0414	391593	392375	-	260	RplD	Ribosomal protein L4	COG0088	[J]
0415	392390	393475	-	361	RplC	Ribosomal protein L3	COG0087	[J]
0416	393619	394368	+	249		Uncharacterized protein		
0417	394373	394654	+	93	RPL42A	Ribosomal protein L44E	COG1631	[J]
0418	394669	394890	+	73	RPS27A	Ribosomal protein S27E	COG2051	[J]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0419	394890	395693	+	267	SUI2	Translation initiation factor eIF2-alpha	COG1093	[J]
0420	395697	395897	+	66		Predicted Zn-ribbon-containing RNA-binding protein	COG2260	[J]
0421	395901	396710	+	269		Uncharacterized enzyme of the ATP-grasp superfamily	COG2047	[R]
0422	397017	397583	+	188		Uncharacterized membrane protein		
0423	397587	398081	+	164		Uncharacterized membrane protein, conserved in archaea	COG4083	[S]
0424	398083	399336	+	417		Uncharacterized conserved protein	COG1379	[S]
0425	399333	400784	+	483		Predicted metal-dependent hydrolase of the TIM-barrel fold		
0426	400786	401517	+	243		Predicted metal-dependent hydrolase of the TIM-barrel fold	COG2159	[R]
0427	401719	402249	+	176		Uncharacterized conserved protein		
0428	402254	402685	+	143		Uncharacterized conserved protein	COG2138	[S]
0429	402699	403346	+	215	AroD	3-dehydroquinate dehydratase	COG0710	[E]
0430	403335	404072	-	245		Flavoprotein involved in thiazole biosynthesis	COG1635	[H]
0431	404095	404466	-	123		Uncharacterized protein conserved in archaea		
0432	404463	404834	-	123		Uncharacterized protein		
0433	404865	405650	-	261	SurE	Predicted acid phosphatase	COG0496	[R]
0434	405568	406407	-	279	DapF	Diaminopimelate epimerase	COG0253	[E]
0435	406436	407173	-	245	DapD	Tetrahydrodipicolinate N-succinyltransferase	COG2171	[E]
0436	407170	407748	-	192	PabA	Anthranilate/para-aminobenzoate synthase component II	COG0512	[EH]
0437	407723	409129	-	468	TrpE	Anthranilate/para-aminobenzoate synthase component I	COG0147	[EH]
0438	409120	409710	-	196		Uncharacterized membrane protein	COG1300	[S]
0439	409925	411559	-	544		Phenylalanyl-tRNA synthetase alpha subunit, archaeal type	COG2024	[J]
0440	411681	412184	+	167		Uncharacterized protein		
0441	412195	412410	+	71		Uncharacterized protein		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0442	412377	413771	+	464		Uncharacterized protein		
0443	413745	414398	-	217		Predicted RNA-binding protein of the translin family	COG 2178	[J]
0444	414419	415777	-	452		tRNA/rRNA cytosine-C5-methylase	COG 0144	[J]
0445	415803	416762	+	319		Uncharacterized protein conserved in archaea	COG 4034	[S]
0446	416913	417761	+	282	NadC	Nicotinate-nucleotide pyrophosphorylase	COG 0157	[H]
0447	417779	418756	-	325		Uncharacterized protein		
0448	418732	419226	-	164	IlvB1	Acetolactate synthase large subunit	COG 0028	[EH]
0449	419733	420248	+	171		Predicted transcription factor, homolog of eukaryotic MBF1	COG 1813	[K]
0450	420252	420827	-	191		Uncharacterized protein		
0451	420814	422439	-	541	FtsA	Actin-like ATPase involved in cell division	COG 0849	[D]
0452	422444	422755	-	103		Predicted pyrophosphatase	COG 1694	[R]
0453	422752	423300	-	182		SAM-dependent methyltransferase	COG 0500	[QR]
0454	423263	423655	-	130		Uncharacterized protein conserved in archaea	COG 1844	[S]
0455	423708	424130	+	140		Uncharacterized protein conserved in archaea	COG 4921	[S]
0456	424099	425370	+	423		GTPase of the HflX family	COG 2262	[R]
0457	425367	425804	-	145		Predicted transcription regulator containing the wHTH DNA-binding domain		
0458	425875	426513	-	212		FOG: CBS domain	COG 0517	[R]
0459	426513	427271	-	252		Ferredoxin	COG 1145	[C]
0460	427268	427711	-	147	EhaP	Ferredoxin	COG 1145	[C]
0461	427686	428825	-	379	EhbK	Ferredoxin	COG 1145	[C]
0462	428829	429407	-	192	EhaQ	Ferredoxin	COG 1145	[C]
0463	429389	430618	-	409	EhaO	Ni,Fe-hydrogenase III large subunit	COG 3261	[C]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0464	430599	431087	-	162	EhaN	Ni,Fe-hydrogenase III small subunit	COG3260	[C]
0465	431084	431524	-	146	EhaM	Uncharacterized protein conserved in archaea	COG4084	[S]
0466	431521	431865	-	114	EhaL	Uncharacterized membrane protein, conserved in archaea	COG4035	[S]
0467	431862	432101	-	79		Uncharacterized protein		
0468	432112	432963	-	283	EhaJ	Membrane protein related to formate hydrogenlyase subunit 4	COG0650	[C]
0469	432967	433170	-	67		Uncharacterized protein		
0470	433183	433854	-	223	EhaH	Uncharacterized membrane protein, conserved in archaea	COG4078	[S]
0471	433838	434515	-	225	EhaG	Uncharacterized membrane protein, conserved in archaea	COG4036	[S]
0472	434512	435021	-	169	EhaF	Uncharacterized membrane protein, conserved in archaea	COG4037	[S]
0473	434978	435265	-	95	EhaE	Uncharacterized membrane protein, conserved in archaea	COG4038	[S]
0474	435258	435500	-	80	EhaD	Uncharacterized membrane protein, conserved in archaea	COG4039	[S]
0475	435497	435760	-	87	EhaC	Uncharacterized membrane protein, conserved in archaea	COG4040	[S]
0476	435757	436278	-	173	EhaB	Uncharacterized membrane protein, conserved in archaea	COG4041	[S]
0477	436275	436568	-	97	EhaA	Uncharacterized membrane protein, conserved in archaea	COG4042	[S]
0478	436592	437665	+	357		Predicted ATPase, MoxR-like family of the AAA+ class	COG0714	[R]
0479	438675	440018	+	447		Uncharacterized protein containing a von Willebrand factor type A (vWA) domain	COG2425	[R]
0480	440015	440614	-	199		Uncharacterized protein		
0481	440625	441635	+	336		Predicted NTPase		
0482	441586	442755	-	389		Predicted transcriptional regulators, consists of a molybdenum cofactor biosynthesis enzyme fused to a HTH DNA-binding domain	COG2896 & COG1522	[H][K]
0483	442817	444034	-	405	LysA	Diaminopimelate decarboxylase	COG0019	[E]
0484	444079	444621	-	180		Uncharacterized protein conserved in archaea	COG4077	[S]

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0485	444618	445595	-	325		Uncharacterized conserved protein	COG1469	[S]
0486	445677	449426	+	1249		ATPases of the AAA+ class & Intein/homing endonuclease	COG0464 & COG1372	[O][L]
0487	449457	449915	+	152		Uncharacterized conserved protein	COG1656	[S]
0488	449908	450531	+	207		Uncharacterized conserved protein	COG2078	[S]
0489	450514	451131	-	205		Uncharacterized proteins, LmbE homologs	COG2120	[S]
0490	451128	452138	-	336		Glycosyltransferase, probably involved in cell wall biogenesis	COG1215	[M]
0491	452156	453241	-	361	CarA	Carbamoylphosphate synthase small subunit	COG0505	[EF]
0492	453622	454674	+	350		Archaea-specific enzyme related to ProFAR isomerase (HisA) and containing an additional uncharacterized domain	COG1411 & COG4043	[R][S]
0493	454678	455469	-	263		Uncharacterized protein conserved in archaea	COG4044	[S]
0494	455483	456004	-	173		Predicted HD superfamily hydrolase	COG1418	[R]
0495	456001	456582	-	193	TFA1	Transcription initiation factor IIE, large subunit	COG1675	[K]
0496	456587	457279	-	230		Uncharacterized protein		
0497	457283	459457	-	724	PurL_2	Phosphoribosylformylglycinamide (FGAM) synthase, synthetase domain	COG0046	[F]
0498	459523	460449	-	308		Fe-S oxidoreductase	COG0247	[C]
0499	460425	461879	-	484		Predicted ribonuclease of the G/E family	COG1530	[J]
0500	461906	462208	+	100	Hisl_1	Phosphoribosyl-ATP pyrophosphohydrolase	COG0140	[E]
0501	462591	463937	+	448		Uncharacterized FAD-dependent dehydrogenase	COG2509	[R]
0502	463950	464894	+	314		Uncharacterized protein conserved in archaea		
0503	465077	466090	+	337		Predicted aminopeptidase	COG2234	[R]



SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0504	466093	466626	+	177		Amidase related to nicotinamidase	COG1335	[Q]
0505	466623	467993	+	456	cDPGS	Cyclic 2,3-diphosphoglycerate-synthetase	COG2403	[R]
0506	467990	468223	-	77	HHT1_1	Histone H3/H4	COG2036	[L]
0507	468287	469069	+	260		Predicted nuclease of the RecB family	COG1637	[L]
0508	469072	469722	+	216	TrpF	Phosphoribosylanthranilate isomerase	COG0135	[E]
0509	469706	473605	-	1299		Predicted protein of the CobN/Mg-chelataase family	COG1429	[H]
0510	473846	475135	+	429		Predicted Zn-dependent metalloproteinase		
0511	475141	476415	+	424		Terpene cyclase/mutase family protein	COG1657	[I]
0512	476375	477415	-	346	Top6A	DNA topoisomerase VI, subunit A	COG1697	[L]
0513	477452	478060	-	202		Predicted RNA-binding protein containing KH domain)	COG1094	[R]
0514	478065	478856	-	263	RIO1_1	Serine/threonine protein kinase involved in cell cycle control	COG1718	[TD]
0515	478853	479188	-	111	InfA	Translation initiation factor IF-1	COG0361	[J]
0516	479449	480423	-	324	TyrS	Tyrosyl-tRNA synthetase	COG0162	[J]
0517	480456	481520	-	354	NMD3	NMD protein affecting ribosome stability and mRNA decay	COG1499	[J]
0518	481521	482639	-	372		Uncharacterized protein conserved in archaea	COG4046	[S]
0519	483150	483854	-	234	LasT	rRNA methylase	COG0565	[J]
0520	483880	485811	+	643		ABC-type ATPase fused to a predicted acetyltransferase domain	COG2401	[R]
0521	485808	486257	-	149		Universal stress protein UspA and related nucleotide-binding proteins	COG0589	[T]
0522	486337	486723	+	128		Zn-finger-containing protein	COG2158	[R]
0523	486677	487123	-	148		Uncharacterized protein conserved in archaea	COG4933	[S]
0524	487264	488313	-	349	Mer	Coenzyme F420-dependent N5,N10-methylene tetrahydromethanopterin reductase	COG2141	[C]
0525	488504	489094	+	196		FOG: CBS domain	COG0517	[R]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0526	489122	489958	+	278		FOG: CBS domain	COG0517	[R]
0527	489930	492113	-	727		Uncharacterized membrane protein specific for M.kandleri, MK-13 family		
0528	492151	493311	+	386		ATP-dependent DNA ligase, homolog of eukaryotic ligase III	COG1423	[L]
0529	493316	493792	+	158		Soluble P-type ATPase	COG4087	[R]
0530	493786	495066	+	426	PyrC	Dihydroorotase	COG0044	[F]
0531	495059	496756	+	565	IlvB2	Acetolactate synthase, large subunit	COG0028	[EH]
0532	497119	497505	+	128		Rubrerythrin	COG1592	[C]
0533	497572	498342	+	256		Predicted metal-dependent hydrolase of the TIM-barrel fold	COG1099	[R]
0534	498533	499327	+	264		Uncharacterized protein conserved in archaea	COG1810	[S]
0535	499336	499764	-	142		Uncharacterized protein		
0536	499901	501817	+	638		6Fe-6S prismane cluster-containing carbon monoxide dehydrogenase catalytic subunit	COG1151	[C]
0537	501838	502950	+	370		Coenzyme F420-reducing hydrogenase, alpha subunit	COG3259	[C]
0538	502964	503680	+	238		Coenzyme F420-reducing hydrogenase, gamma subunit	COG1941	[C]
0539	503796	504623	+	275		Coenzyme F420-reducing hydrogenase, beta subunit	COG1035	[C]
0540	504665	505129	+	154		Uncharacterized protein		
0541	505144	505872	+	242		Uncharacterized protein conserved in archaea	COG4047	[S]
0542	506098	506835	+	245		Predicted transcriptional regulator consisting of a V4R domain and a DNA-binding HTH domain	COG0640 & COG1719	[K][R]
0543	506807	507148	-	113		Uncharacterized conserved protein, homolog of gamma-carboxymuconolactone decarboxylase subunit	COG0599	[S]
0544	507396	509270	+	624	ThrS	Threonyl-tRNA synthetase	COG0441	[J]
0545	509272	509775	-	167	IlvH	Acetolactate synthase, small subunit	COG0440	[E]

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0546	509917	510690	+	257	TatD	Mg-dependent DNase	COG0084	[L]
0547	510899	511126	+	75		Uncharacterized protein		
0548	511128	511655	+	175		Predicted Zn-dependent protease	COG1913	[R]
0549	511613	512170	+	185		Acetyltransferase	COG0456	[R]
0550	512386	513675	+	429	GltB1	Glutamate synthase subunit 2	COG0069	[E]
0551	513689	514252	+	187	GuaA2	Glutamine amidotransferase subunit of GMP synthase	COG0518	[F]
0552	514237	515541	+	434	NhaP	NhaP-type Na <sup>+</sup> /H <sup>+</sup> or K <sup>+</sup> /H <sup>+</sup> antiporter	COG0025	[P]
0553	515607	516128	+	173	MoaB	Molybdopterin biosynthesis enzyme	COG0521	[H]
0554	516136	516606	-	156	MoaC	Molybdenum cofactor biosynthesis enzyme	COG0315	[H]
0555	518513	518920	+	135		DNA endonuclease related to intein-encoded endonucleases	COG3780	[L]
0556	519350	520219	-	289		RecA-superfamily ATPase implicated in signal transduction	COG0467	[T]
0557	520203	520772	-	189		Uncharacterized protein conserved in archaea	COG1790	[S]
0558	521047	522033	+	328		beta-Ribofuranosylaminobenzene 5'-phosphate synthase (beta-RFAP synthase)	COG1907	[R]
0559	522045	523307	+	420	SIK1	Protein implicated in ribosomal biogenesis, Nop56p homolog	COG1498	[J]
0560	523355	524053	+	232	NOP1	Fibrillarin-like rRNA methylase	COG1889	[J]
0561	524303	525274	+	323	PitA	Phosphate/sulphate permeases	COG0306	[P]
0562	525271	525885	+	204		Uncharacterized protein		
0563	525882	526838	+	318	PyrD	Dihydroorotate dehydrogenase	COG0167	[F]
0564	526826	527614	+	262	PyrK	Dihydroorotate dehydrogenase electron transfer subunit similar to 2-polyprenylphenol hydroxylase and related flavodoxin oxidoreductases	COG0543	[HC]
0565	527589	528335	+	248		Glycosyltransferase involved in cell wall biogenesis	COG0463	[M]
0566	528389	529435	+	348	Exo	5'-3' exonuclease	COG0258	[L]

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0567	529503	530324	-	273		Uncharacterized membrane protein, conserved in archaea	COG 3366	[S]
0568	530382	531287	+	301		L-alanine-DL-glutamate epimerase and related enzymes of enolase superfamily	COG 4948	[MR]
0569	531423	532460	+	345		Uncharacterized conserved protein	COG 3367	[S]
0570	532442	532792	-	116		Uncharacterized protein conserved in archaea	COG 4048	[S]
0571	532866	533444	+	192		Uncharacterized metal-binding protein conserved in archaea	COG 4887	[R]
0572	533451	534368	-	305	Hdr B	Heterodisulfide reductase, subunit B	COG 2048	[C]
0573	534381	534959	-	192	Hdr C	Heterodisulfide reductase, subunit C	COG 1150	[C]
0574	535060	535818	+	252		Transcriptional regulator of the LysR family	COG 0583	[K]
0575	536146	536853	-	235		Uncharacterized protein conserved in archaea	COG 2043	[S]
0576	536956	537345	+	129		Predicted transcriptional regulator	COG 3355	[K]
0577	537359	537568	+	69		Predicted nucleic-acid-binding protein containing an archaeal-type C2H2 Zn-finger	COG 4049	[R]
0578	537647	538099	-	150	Tag D	Cytidyltransferase	COG 0615	[MI]
0579	538169	538615	+	148		Uncharacterized protein conserved in archaea	COG 4050	[S]
0580	538628	539851	+	407		Activator of 2-hydroxyglutaryl-CoA dehydratase (HSP70-class ATPase domain)	COG 1924	[I]
0581	539864	540490	+	208		Uncharacterized protein conserved in archaea	COG 4051	[S]
0582	540487	541335	+	282		Predicted Fe-S oxidoreductase	COG 0535	[R]
0583	541340	542266	+	308		Uncharacterized protein conserved in archaea, related to methyl coenzyme M reductase II, operon protein C (mtrC)	COG 4052	[R]
0584	542479	543207	-	242		Uncharacterized protein specific for M.kandleri, MK-1 family		
0585	543481	544767	+	428		Uncharacterized protein		
0586	545004	545954	+	316	PRI 1	Eukaryotic-type DNA primase, catalytic (small) subunit	COG 1467	[L]

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0587	545951	546523	+	190		Uncharacterized conserved protein	COG 1920	[S]
0588	546629	547708	+	359		Predicted ATP-utilizing enzyme of the ATP-grasp superfamily (probably carbolligase)	COG 1759	[R]
0589	547818	549116	+	432	ThiD	Hydroxymethylpyrimidine/phosphomethylpyrimidine kinase fused to uncharacterized conserved domain	COG 0351 & COG 1992	[H][S]
0590	549121	549732	+	203		Uncharacterized protein		
0591	549969	550763	+	264		Uncharacterized secreted protein specific for M.kandleri with repeats, MK-6 family		
0592	550754	551515	+	253		Uncharacterized protein specific for M.kandleri with repeats, MK-6 family		
0593	551518	551976	+	152		Uncharacterized protein specific for M.kandleri, MK-6 family		
0594	552664	552933	+	89		Uncharacterized protein		
0595	553054	553923	+	289		Predicted archaea-specific methyltransferase	COG 2521	[R]
0596	553892	554356	-	154		Uncharacterized conserved protein	COG 1833	[S]
0597	554373	556742	+	789		Uncharacterized membrane protein specific for M.kandleri, MK-13 family		
0598	556733	557212	+	159		Uncharacterized protein		
0599	557225	558235	+	336		Predicted methyltransferase	COG 2520	[R]
0600	558229	558702	-	157		RecB-family nuclease	COG 4080	[L]
0601	558753	559712	+	319		ABC-type nitrate/sulfonate/bicarbonate transport systems, periplasmic components	COG 0715	[P]
0602	559712	560467	+	251		ABC-type nitrate/sulfonate/bicarbonate transport system, permease component	COG 0600	[P]
0603	560458	561198	+	246		ABC-type nitrate/sulfonate/bicarbonate transport system, ATPase component	COG 1116	[P]

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0604	561299	562033	+	244		tRNA-dihydrouridine synthase	COG0042	[J]
0605	562156	563580	-	474		Transposase and inactivated derivatives	COG0675	[L]
0606	563941	565068	+	375	Kch_1	Kef-type K <sup>+</sup> transport systems, predicted NAD-binding component & Predicted small molecule binding protein (contains 3H domain)	COG1226 & COG1827	[P][R]
0607	566155	567084	-	309	ThiL	Thiamine monophosphate kinase	COG0611	[H]
0608	567068	567601	+	177	NIP7	Predicted RNA-binding protein involved in ribosomal biogenesis, contains PUA domain	COG1374	[J]
0609	567603	568250	+	215		Predicted metabolic regulator containing the ACT domain	COG1707	[R]
0610	568264	568827	+	187		Adenine/guanine phosphoribosyltransferases and related PRPP-binding proteins	COG0503	[F]
0611	568818	569834	-	338		Uncharacterized protein conserved in archaea	COG1665	[S]
0612	569848	570273	+	141		Predicted DNA-binding protein with PD1-like DNA-binding motif	COG1661	[R]
0613	570239	571111	-	290	Map	Methionine aminopeptidase	COG0024	[J]
0614	571138	571800	+	220		Uncharacterized protein		
0615	572038	572349	-	103		Predicted metal-binding protein conserved in archaea	COG1745	[R]
0616	572365	573780	-	471	LonB	Predicted ATP-dependent protease	COG1067	[O]
0617	573932	575161	-	409	DnaG	DNA primase (bacterial type)	COG0358	[L]
0618	575280	576332	-	350	GapA	Glyceraldehyde-3-phosphate dehydrogenase	COG0057	[G]
0619	576853	577878	-	341	SUA7_1	Transcription initiation factor IIB	COG1405	[K]
0620	578231	579271	-	346	SelA	Selenocysteine synthase	COG1921	[E]
0621	579226	580800	-	524		Predicted RNA modification enzyme consisting of a 3-phosphoadenosine 5-phosphosulfate sulfotransferase fused to RNA-binding PUA domain	COG5270 & COG0175	[J][E][H]
0622	580781	582307	-	508	ArgH	Argininosuccinate lyase	COG0165	[E]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0623	582471	583118	+	215		Predicted cysteine protease of the transglutaminase-like supefamily	COG1305	[E]
0624	583203	583934	+	243		Uncharacterized protein conserved in archaea	COG1667	[S]
0625	583941	584888	+	315	Mch	Methenyltetrahydromethanopterin cyclohydrolase	COG3252	[H]
0626	588697	589611	+	304		Uncharacterized protein specific for M.kandleri, MK-7 family		
0627	589834	590232	-	132	FlpD2	Coenzyme F420-reducing hydrogenase, delta subunit	COG1908	[C]
0628	590310	591596	+	428	AroA	5-enolpyruvylshikimate-3-phosphate synthase	COG0128	[E]
0629	591588	592031	-	147		Predicted hydrocarbon binding protein (contains V4R domain)	COG1719	[R]
0630	592104	592511	-	135		Predicted hydrocarbon binding protein (contains V4R domain)	COG1719	[R]
0631	592609	593769	+	386	AroC	Chorismate synthase	COG0082	[E]
0632	593764	594639	-	291		Predicted hydrocarbon binding protein (contains V4R domain)	COG1719	[R]
0633	594757	595908	+	383		Aspartate aminotransferase	COG0075	[E]
0634	595894	596667	-	257		Uncharacterized protein conserved in archaea	COG4053	[S]
0635	596667	597305	+	212	SUA5	Translation factor (SUA5)	COG0009	[J]
0636	597298	597756	+	152		Uncharacterized protein conserved in archaea	COG4090	[S]
0637	597753	598430	+	225		SAM-dependent methyltransferase	COG0500	[QR]
0638	598427	598936	+	169		Uncharacterized conserved protein	COG2042	[S]
0639	598998	600539	-	513		Predicted membrane protein		
0640	600529	601014	-	161		Uncharacterized protein		
0641	601207	601356	+	49	RPL40A	Ribosomal protein L40E	COG1552	[J]
0642	601360	602079	+	239		Predicted phosphate-binding enzyme of the TIM-barrel fold	COG1646	[R]
0643	602066	602473	-	135		Uncharacterized protein		
0644	602534	603211	+	225		Predicted ATPase of the PP-loop superfamily	COG2102	[R]
0645	603358	604410	+	350		Uncharacterized protein		



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0646	604733	604954	-	73		Uncharacterized protein		
0647	605491	606189	+	232		Uncharacterized protein specific for M.kandleri, MK-1 family		
0648	606223	608511	-	762	Hyp F	Hydrogenase maturation factor	COG0068	[O]
0649	608508	609632	-	374		Uncharacterized protein		
0650	609636	610853	-	405		Fe-S oxidoreductase, related to NifB/MoaA family	COG1625	[C]
0651	611026	612360	+	444	Mcr B	Methyl coenzyme M reductase, beta subunit	COG4054	[H]
0652	612470	612991	+	173	Mcr D	Methyl coenzyme M reductase, subunit D	COG4055	[H]
0653	613000	613608	+	202	Mcr C	Methyl coenzyme M reductase, subunit C	COG4056	[H]
0654	613750	614523	+	257	Mcr G	Methyl coenzyme M reductase, gamma subunit	COG4057	[H]
0655	614620	616281	+	553	Mcr A	Methyl coenzyme M reductase, alpha subunit	COG4058	[H]
0656	616411	617307	+	298	MtrE	N5-methyl-tetrahydromethanopterin:coenzyme M methyltransferase, subunit E	COG4059	[H]
0657	617423	618100	+	225	MtrD	N5-methyl-tetrahydromethanopterin:coenzyme M methyltransferase, subunit D	COG4060	[H]
0658	618120	618932	+	270	MtrC	N5-methyl-tetrahydromethanopterin:coenzyme M methyltransferase, subunit C	COG4061	[H]
0659	618946	619284	+	112	MtrB	N5-methyl-tetrahydromethanopterin:coenzyme M methyltransferase, subunit B	COG4062	[H]
0660	619299	620057	+	252	MtrA	N5-methyl-tetrahydromethanopterin:coenzyme M methyltransferase, subunit A	COG4063	[H]
0661	620071	620295	+	74	Mtr G	N5-methyl-tetrahydromethanopterin:coenzyme M methyltransferase, subunit G	COG4064	[H]
0662	620318	621286	+	322	MtrH	N5-methyl-tetrahydromethanopterin:coenzyme M methyltransferase, subunit H	COG1962	[H]
0663	621086	622561	-	491		Predicted protein of the CobN/Mg-chelatase family, a fragment	COG1429	[H]
0664	622607	624328	+	573		Predicted protein of the CobN/Mg-chelatase family, a fragment	COG1429	[H]

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0665	624364	625800	+	478		Uncharacterized protein conserved in archaea	COG4065	[S]
0666	625919	626347	+	142		Uncharacterized protein conserved in archaea	COG4066	[S]
0667	626344	627258	+	304	Met E	Methionine synthase II (cobalamin-independent)	COG0620	[E]
0668	627325	627636	+	103		Uncharacterized protein conserved in archaea		
0669	627780	628319	-	179		Membrane-associated phospholipid phosphatase	COG0671	[I]
0670	628363	628776	-	137		Predicted NADH-flavin reductase	COG2510	[S]
0671	628773	629018	-	81		Uncharacterized protein		
0672	629019	630314	-	431		Pyridoxal-phosphate-dependent enzyme related to glutamate decarboxylase	COG0076	[E]
0673	630694	631617	+	307		tRNA/rRNA cytosine-C5-methylase	COG0144	[J]
0674	631691	632797	+	368		RIO1-like serine/threonine protein kinase fused to an N-terminal DNA-binding HTH domain	COG0478	[T]
0675	632724	633431	+	235		NCAIR mutase	COG1691	[R]
0676	633524	634726	+	400		Uncharacterized conserved protein	COG0585	[S]
0677	634723	634887	-	54		Zn-ribbon-containing protein		
0678	634980	635999	+	339	Trp D	Anthranilate phosphoribosyltransferase	COG0547	[E]
0679	636060	639833	-	1257	Fus A	Translation elongation and release factor (GTPase), contains an intein	COG0480 & COG1372	[J][L]
0680	639848	640441	-	197	Rps G	Ribosomal protein S7	COG0049	[J]
0681	640545	640988	-	147	Rps L	Ribosomal protein S12	COG0048	[J]
0682	641007	641435	-	142	Nus A_1	Transcription elongation factor NusA	COG0195	[K]
0683	641451	641780	-	109	RPL 30	Ribosomal protein L30E	COG1911	[J]
0684	642269	643558	-	429	Rpo C_1	DNA-directed RNA polymerase largest subunit, the N-terminal part	COG0086	[K]

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0685	643555	646416	-	953	Rpo C_2	DNA-directed RNA polymerase largest subunit, the C-terminal part	COG 0086	[K]
0686	646413	648335	-	640	Rpo B_1	DNA-directed RNA polymerase second-largest subunit, the N-terminal part	COG 0085	[K]
0687	648385	649962	-	525	Rpo B_2	DNA-directed RNA polymerase second-largest subunit, the N-terminal part	COG 0085	[K]
0688	649995	650273	-	92	RPB 5	DNA-directed RNA polymerase subunit H	COG 2012	[K]
0689	650240	650781	-	180		Ferredoxin	COG 1145	[C]
0690	650789	653419	-	876	Sbc C	SMC1-family ATPase involved in DNA repair	COG 0419	[L]
0691	653427	654782	-	451	Sbc D	DNA repair exonuclease of the SbcD/Mre11-family	COG 0420	[L]
0692	654785	656368	-	527		Predicted P-loop ATPase	COG 0433	[R]
0693	656349	657518	-	389		Uncharacterized protein conserved in archaea		
0694	657749	658219	-	156		Uncharacterized protein		
0695	658227	658802	-	191		Uncharacterized protein		
0696	658768	659217	-	149		Uncharacterized conserved protein	COG 1991	[S]
0697	659236	661821	+	861		Uncharacterized protein		
0698	661961	663658	-	565		Uncharacterized secreted protein		
0699	663655	664569	-	304		Uncharacterized secreted protein		
0700	664566	664736	-	56		Uncharacterized secreted protein		
0701	664747	664935	-	62		Predicted secreted protein specific for M.kandleri, MK-18 family		
0702	664932	665126	-	64		Predicted secreted protein specific for M.kandleri, MK-19 family		
0703	665111	666085	-	324	Ppp A	Type II secretory pathway, prepilin signal peptidase PulO and related peptidases	COG 1989	[NO U]
0704	666091	667089	-	332		Uncharacterized protein		
0705	668048	669025	-	325		Flp pilus assembly protein TadC	COG 2064	[NU]

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0706	669056	670144	-	362		Flp pilus assembly protein TadC	COG2064	[NU]
0707	670334	672142	-	602		Flp pilus assembly protein, ATPase CpaF	COG4962	[U]
0708	672151	673908	-	585		Predicted AAA+ class ATPase with chaperone activity	COG0606	[O]
0709	673914	674513	-	199	RsmC	16S RNA G1207 methylase RsmC	COG2813	[J]
0710	675105	676400	-	431	AsnS	Aspartyl/asparaginyl-tRNA synthetases	COG0017	[J]
0711	676444	677739	-	431	HisD	Histidinol dehydrogenase	COG0141	[E]
0712	677717	678481	-	254		Uncharacterized protein conserved in archaea	COG1701	[S]
0713	678478	679608	-	376	Dfp	Phosphopantothenoylcysteine synthetase/decarboxylase	COG0452	[H]
0714	679601	680143	-	180	NusA_2	Transcription elongation factor NusA	COG0195	[K]
0715	680294	680575	+	93	Ssh10b_1	Archaea-specific DNA-binding protein	COG1581	[K]
0716	680541	682988	-	815		Uncharacterized protein specific for M.kandleri, MK-40 family		
0717	682947	685229	+	760	CdhA_1	CO dehydrogenase/acetyl-CoA synthase alpha subunit	COG1152	[C]
0718	685235	685714	+	159	CdhB	CO dehydrogenase/acetyl-CoA synthase epsilon subunit	COG1880	[C]
0719	685725	687623	+	632	CdhA_1	CO dehydrogenase/acetyl-CoA synthase alpha subunit	COG1152	[C]
0720	687632	689035	+	467	CdhC	CO dehydrogenase/acetyl-CoA synthase beta subunit	COG1614	[C]
0721	689032	689805	+	257	CooC_1	CO dehydrogenase maturation factor	COG3640	[D]
0722	689798	691000	+	400	CdhD	CO dehydrogenase/acetyl-CoA synthase delta subunit (corrinoid Fe-S protein)	COG2069	[C]
0723	691014	692402	+	462	CdhE	CO dehydrogenase/acetyl-CoA synthase gamma subunit (corrinoid Fe-S protein)	COG1456	[C]
0724	692457	693386	+	309		Nucleoside-diphosphate-sugar epimerase	COG0451	[MG]
0725	693426	693929	+	167	HycB	Fe-S-cluster-containing hydrogenase component	COG1142	[C]
0726	693907	694650	+	247	CooC_2	CO dehydrogenase maturation factor	COG3640	[D]

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0727	694590	694850	+	86		Ferredoxin	COG1146	[C]
0728	694843	695961	+	372	PorA_2	Pyruvate:ferredoxin oxidoreductase, alpha subunit	COG0674	[C]
0729	695958	696773	+	271	PorB_2	Pyruvate:ferredoxin oxidoreductase, beta subunit	COG1013	[C]
0730	696757	697287	+	176	PorG_2	Pyruvate:ferredoxin oxidoreductase, gamma subunit	COG1014	[C]
0731	697284	698363	+	359	SucC	Succinyl-CoA synthetase beta subunit	COG0045	[C]
0732	698367	699230	+	287	SucD	Succinyl-CoA synthetase alpha subunit	COG0074	[C]
0733	699231	700091	+	286		Predicted archaea-specific kinase of the sugar kinase superfamily	COG1829	[R]
0734	700084	700260	+	58		Predicted RNA-binding protein	COG1532	[R]
0735	700349	701005	-	218	PyrF	Orotidine-5'-phosphate decarboxylase	COG0284	[F]
0736	700981	701478	-	165		Uncharacterized protein		
0737	701479	702372	-	297	DYS1	Deoxyhypusine synthase	COG1899	[O]
0738	702369	703142	-	257	SpeB	Agmatinase	COG0010	[E]
0739	703117	703527	-	136	Efp	Translation initiation factor eIF-5A	COG0231	[J]
0740	703599	704051	+	150	SpeA	Pyruvoyl-dependent arginine decarboxylase (PviArgDC) [Contains: Pyruvoyl-dependent arginine decarboxylase beta subunit; Pyruvoyl-dependent arginine decarboxylase alpha subunit]	COG1945	[S]
0741	704058	705071	+	337	SuhB	Archaea-specific fructose-1,6-bisphosphatase fused to predicted pyrophosphatase of the PRA-PH family	COG0483 & COG1694	[G][R]
0742	705044	705874	+	276		Predicted sugar kinase	COG0061	[G]
0743	705968	706243	-	91	HHT1_2	Histones H3/H4	COG2036	[L]
0744	706262	706693	+	143		Predicted nuclei-acid-binding protein, consists of a PIN domain and a Zn-ribbon	COG1439	[R]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0745	706675	707529	+	284		Predicted metalloprotease fused to aspartyl protease	COG 4067 & COG 4740	[O][R]
0746	707526	708443	+	305	HemC	Porphobilinogen deaminase	COG 0181	[H]
0747	708436	709227	+	263	DPH5	Methyltransferase involved in diphthamide biosynthesis	COG 1798	[J]
0748	709231	709587	+	118		Uncharacterized protein conserved in archaea	COG 1885	[S]
0749	709592	710701	-	369		Uncharacterized protein conserved in archaea, possible membrane metallohydrolase		
0750	710703	711950	-	415		Uncharacterized protein conserved in archaea, Zn-ribbon domain containing		
0751	711973	712422	-	149		Uncharacterized protein conserved in archaea		
0752	712425	713867	-	480	MurE_1	UDP-N-acetylmuramyl tripeptide synthase	COG 0769	[M]
0753	713877	714947	-	356	MraY	UDP-N-acetylmuramyl pentapeptide phosphotransferase	COG 0472	[M]
0754	714964	716103	-	379	CarB_1	Carbamoylphosphate synthase large subunit	COG 0458	[EF]
0755	716100	717638	-	512	MurC	UDP-N-acetylmuramate-alanine ligase	COG 0773	[M]
0756	717691	718695	-	334		Predicted ATPase of the PP-loop superfamily implicated in cell cycle control	COG 0037	[D]
0757	718688	720403	-	571	GlnS	Glutamyl-tRNA synthetase	COG 0008	[J]
0758	720849	722627	-	592	ArgS	Arginyl-tRNA synthetase	COG 0018	[J]
0759	722643	723872	-	409	eRF1	Peptide chain release factor eRF1	COG 1503	[J]
0760	723901	724572	+	223	PyrH	Uridylate kinase	COG 0528	[F]
0761	724579	724770	+	63		Zn-ribbon containing protein	COG 4068	[S]
0762	724738	725484	-	248		Predicted RNA methylase	COG 4076	[R]
0763	725481	726020	-	179		Uncharacterized conserved protein	COG 1432	[S]
0764	726042	726800	-	252		Uncharacterized protein		

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0765	726742	727086	-	114		Uncharacterized protein		
0766	727083	728198	-	371	PhoH	Phosphate starvation-inducible protein PhoH, predicted ATPase	COG1702	[T]
0767	728211	729026	-	271	UppS	Undecaprenyl pyrophosphate synthase	COG0020	[I]
0768	729066	729563	+	165		Predicted phosphoesterase	COG0622	[R]
0769	729717	730787	+	356		tRNA/rRNA cytosine-C5-methylase	COG0144	[J]
0770	730816	731811	+	331		Predicted integral membrane protein	COG0392	[S]
0771	732207	734036	+	609		Predicted acyltransferase	COG4801	[R]
0772	734033	734974	-	313		Carbonic anhydrases/acetyltransferase homolog, isoleucine patch superfamily	COG0663	[R]
0773	735042	735533	-	163		Uncharacterized protein conserved in archaea	COG4072	[S]
0774	735536	736510	-	324	IspA	Geranylgeranyl pyrophosphate synthase	COG0142	[H]
0775	736523	737884	-	453		Predicted hydrolase of the metallo-beta-lactamase superfamily	COG0595	[R]
0776	737872	738996	-	374	LldD	L-lactate dehydrogenase (FMN-dependent)	COG1304	[C]
0777	738974	739693	-	239		Predicted archaeal kinase	COG1608	[R]
0778	739816	740862	+	348	Thil1	Thiamine biosynthesis ATP pyrophosphatase	COG0301	[H]
0779	740929	741837	+	302		FOG: CBS domain	COG0517	[R]
0780	741887	743083	+	398		Uncharacterized conserved protein	COG3287	[S]
0781	743138	743650	+	170	LeuD_1	3-isopropylmalate dehydratase small subunit	COG0066	[E]
0782	743656	744663	+	335	LeuB_1	Isocitrate/isopropylmalate dehydrogenase	COG0473	[E]
0783	744973	745683	+	236		Uncharacterized protein		
0784	745708	746904	+	398	TrpB	Tryptophan synthase beta chain	COG0133	[E]
0785	746905	747300	-	131		Predicted hydrocarbon binding protein (contains V4R domain)	COG1719	[R]
0786	747316	747681	+	121		Uncharacterized protein conserved in archaea	COG2098	[S]



SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0787	747678	748961	+	427		Protein containing cytidyltransferase domain and predicted nucleotidyltransferase (HIG superfamily) domain	COG 0615 & COG 1323	[M][R]
0788	748958	750166	+	402		Fe-S oxidoreductase family protein	COG 1032	[C]
0789	750112	750972	+	286		Possible metal-dependent hydrolase		
0790	750903	751583	-	226	PurL <sub>-1</sub>	Phosphoribosylformylglycinamide (FGAM) synthase, glutamine amidotransferase subunit	COG 0047	[F]
0791	751653	751907	-	84	PurS	Phosphoribosylformylglycinamide (FGAM) synthase, PurS subunit	COG 1828	[F]
0792	751904	752647	-	247	PurC	Phosphoribosylaminoimidazolesuccinocarboxamide (SAICAR) synthase	COG 0152	[F]
0793	752727	753977	+	416		Uncharacterized conserved protein	COG 3287	[S]
0794	753993	755180	+	395		Uncharacterized protein conserved in archaea	COG 4069	[S]
0795	755237	756220	+	327		Selenophosphate synthetase	COG 2144	[R]
0796	756217	757752	+	511		Predicted peptidyl-prolyl cis-trans isomerase (rotamase), cyclophilin family	COG 4070	[O]
0797	757749	759056	+	435		Fe-S oxidoreductase	COG 1032	[C]
0798	759053	760315	+	420	TyrA <sub>2</sub>	Prephenate dehydrogenase	COG 0287	[E]
0799	760363	762369	-	668		Coenzyme F420-reducing hydrogenase, beta subunit fused to oxidoreductase related to Nitrite reductase and Dissimilatory sulfite reductase (desulfoviridin), alpha and beta subunits	COG 1035 & COG 2221	[C][C]
0800	762431	762814	+	127		Predicted transcriptional regulator containing a wHTH DNA-binding domain	COG 3355	[K]
0801	762811	763422	+	203		Oxidoreductase related to Nitrite reductase and Dissimilatory sulfite reductase (desulfoviridin), alpha and beta subunits	COG 2221	[C]
0802	763376	764641	-	421		Uncharacterized protein		
0803	764701	765237	+	178		SpoU-like RNA methylase	COG 1303	[S]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0804	765234	765932	+	232	ApaH	Diadenosine tetraphosphatase	COG0639	[T]
0805	765929	766717	-	262		Uncharacterized protein		
0806	766921	768012	-	363		Possible Zn-dependent metallohydrolase		
0807	768031	768816	+	261		Uncharacterized conserved protein	COG1912	[S]
0808	768856	770355	-	499		Short chain dehydrogenase fused to sugar kinase	COG0062 & COG0063	[S][G]
0809	770475	771254	+	259		ABC-type antimicrobial peptide transport system, ATPase component	COG1136	[V]
0810	771251	771961	+	236	HypB_1	Ni <sup>2+</sup> -binding GTPase involved in regulation of expression and maturation of urease and hydrogenase	COG0378	[OK]
0811	771930	772610	+	226		Predicted Fe-S protein	COG2000	[R]
0812	772762	773676	-	304		Uncharacterized conserved protein	COG1578	[S]
0813	773691	774935	-	414		Predicted membrane-associated Zn-dependent protease	COG0750	[M]
0814	774937	775368	-	143		Uncharacterized conserved protein	COG0432	[S]
0815	775372	776106	+	244	MscS	Small-conductance mechanosensitive channel	COG0668	[M]
0816	776227	777129	+	300	Ftr_2	Formylmethanofuran:tetrahydromethanopterin formyltransferase	COG2037	[C]
0817	777133	778026	+	297		Sugar kinase of the ribokinase family	COG0524	[G]
0818	778042	778800	-	252		Organic-radical-activating enzyme	COG0602	[O]
0819	778761	779243	-	160		6-pyruvoyl-tetrahydropterin synthase	COG0720	[H]
0820	779435	781207	+	590	PheT	Phenylalanyl-tRNA synthetase beta subunit	COG0072	[J]
0821	781211	782434	+	407	FtsZ_1	FtsZ GTPase involved in cell division	COG0206	[D]
0822	782450	782635	+	61	Sss1	Protein translocase subunit Sss1	COG2443	[U]
0823	782651	783142	+	163	NusG	Transcription antiterminator NusG	COG0250	[K]

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0824	783170	783670	+	166	RplK	Ribosomal protein L11	COG0080	[J]
0825	783684	784328	+	214	RplA	Ribosomal protein L1	COG0081	[J]
0826	784328	785416	+	362	RplJ	Ribosomal protein L10	COG0244	[J]
0827	785439	785981	+	180		Predicted nucleotide kinase	COG1618	[F]
0828	785987	787657	+	556	SdhA	Succinate dehydrogenase/fumarate reductase, flavoprotein subunit	COG1053	[C]
0829	787632	789431	-	599	AdeC	Adenine deaminase	COG1001	[F]
0830	789454	790515	-	353		Uncharacterized protein specific for M.kandleri, MK-25 family		
0831	790663	791670	-	335		Uncharacterized membrane protein specific for M.kandleri, MK-24 family		
0832	791741	792721	-	326	IlvC	Ketol-acid reductoisomerase	COG0059	[EH]
0833	792735	793019	-	94	RPL14A	Ribosomal protein L14E	COG2163	[J]
0834	793046	794548	+	500		Uncharacterized membrane protein		
0835	794560	797016	+	818		Archaea-specific Superfamily II helicase	COG1202	[R]
0836	797005	798327	-	440		Uncharacterized protein		
0837	798324	798665	-	113		Uncharacterized protein		
0838	798710	799576	+	288		Uncharacterized protein conserved in archaea	COG4071	[S]
0839	799566	800123	-	185	SPT15	Transcription initiation factor TFIID (TATA-binding protein)	COG2101	[K]
0840	800146	801222	-	358		Predicted molecular chaperone distantly related to HSP70-fold metalloproteases	COG2377	[O]
0841	801199	801678	+	159	RplV	Ribosomal protein L22	COG0091	[J]
0842	801692	802375	+	227	RpsC	Ribosomal protein S3	COG0092	[J]
0843	802379	802612	+	77	RpmC	Ribosomal protein L29	COG0255	[J]
0844	802632	802952	+	106	SUI1	Translation initiation factor (SUI1)	COG0023	[J]
0845	802945	803634	-	229		SAM-dependent methyltransferase	COG0500	[QR]

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0846	803550	803876	+	108	POP4_1	RNAse P subunit P29	COG1588	[J]
0847	803850	804587	-	245		Membrane protease subunit, stomatin/prohibitin homolog	COG0330	[O]
0848	804584	805012	-	142		Membrane protein implicated in regulation of membrane protease activity	COG1585	[OU]
0849	805062	806366	+	434	Lpd	Dihydrolipoamide dehydrogenase	COG1249	[C]
0850	806368	808374	-	668	MetG	Methionyl-tRNA synthetase	COG0143 & COG0073	[J][R]
0851	808381	809715	-	444		Uncharacterized membrane protein specific for M.kandleri, MK-15 family		
0852	809802	810416	-	204		Uncharacterized protein		
0853	810419	811066	-	215		Uncharacterized membrane protein specific for M.kandleri, MK-15 family		
0854	811293	812264	-	323		Predicted UDP-N-acetylglucosamine 2-epimerase of the MurG family		
0855	812269	812874	-	201	HisB	Imidazoleglycerol-phosphate dehydratase	COG0131	[E]
0856	812939	813283	+	114		Predicted RNA-binding protein containing a TRAM domain	COG4085	[R]
0857	813255	814070	+	271		Uncharacterized protein		
0858	814061	814984	-	307	SUA7_2	Transcription initiation factor IIB	COG1405	[K]
0859	815000	815284	-	94	GAR1	RNA-binding protein involved in rRNA processing	COG3277	[J]
0860	815362	815964	-	200		Ferredoxin	COG1146	[C]
0861	815970	816254	+	94		Uncharacterized protein		
0862	816285	817220	+	311	PhoU	Phosphate uptake regulator	COG0704	[P]
0863	817232	817948	+	238	FtsZ_2	FtsZ GTPase involved in cell division	COG0206	[D]
0864	817961	818197	+	78		Predicted DNA-binding protein		
0865	818237	819400	+	387		Predicted kinase related to thiamine pyrophosphokinase	COG1364	[E]
0866	819624	820862	+	412		Uncharacterized conserved protein	COG1915	[S]

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0867	820834	821088	-	84		Uncharacterized protein conserved in archaea	COG4082	
0868	821117	822100	+	327		2-Phosphoglycerate kinase	COG2074	[G]
0869	822107	822523	+	138		CBS-domain-containing protein	COG0517	[R]
0870	822747	823631	-	294		Uncharacterized protein		
0871	823635	824180	-	181	CyaB	Adenylate cyclase, class 2 (thermophilic)	COG1437	[F]
0872	824222	825364	-	380	EriC	Chloride channel protein EriC	COG0038	[P]
0873	825400	825711	+	103	CpsB_1	Mannose-6-phosphate isomerase	COG0662	[G]
0874	825979	826695	+	238		Acetyltransferase (the isoleucine patch superfamily)	COG0110	[R]
0875	826703	827305	+	200		Uncharacterized protein		
0876	827312	828238	+	308	CitG_2	Triphosphoribosyl-dephospho-CoA synthetase	COG1767	[H]
0877	828174	828677	+	167		Uncharacterized protein		
0878	828838	830148	+	436	RPT1	ATP-dependent 26S proteasome regulatory subunit	COG1222	[O]
0879	830233	831030	+	265		Uncharacterized protein		
0880	830924	831646	+	240		Glycosyltransferase involved in cell wall biogenesis	COG0463	[M]
0881	831689	833029	+	446		NAD(FAD)-dependent dehydrogenase	COG0446	[R]
0882	833026	833541	+	171		Permease related to cation transporters	COG1824	[P]
0883	833538	834059	+	173		Permease related to cation transporters	COG1824	[P]
0884	834071	834661	+	196		Uncharacterized conserved protein	COG3273	[S]
0885	834663	834959	+	98		Predicted transcriptional regulator consisting of an HTH domain fused to a Zn-ribbon	COG3357	[K]
0886	834949	835605	-	218		Uncharacterized protein		
0887	835602	836366	-	254		Uncharacterized protein		
0888	836360	837130	-	256	TruA	Pseudouridylate synthase (tRNA psi55)	COG0101	[J]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0889	837127	838032	-	301		Predicted enzyme related to selenophosphate synthetase	COG 2144	[R]
0890	838029	839210	-	393		Predicted membrane protein	COG 1784	[S]
0891	839229	839777	+	182		Predicted membrane protein		
0892	839829	841106	-	425		Nucleoside-diphosphate-sugar pyrophosphorylase involved in lipopolysaccharide biosynthesis/translation initiation factor eIF2B subunit	COG 1208	[MJ]
0893	841103	842461	-	452	CpsG_1	Phosphomannomutase	COG 1109	[G]
0894	842475	843281	+	268		Predicted DNA-modification methylase	COG 1041	[L]
0895	843334	844707	-	457		Fe-S oxidoreductase similar to Mg-protoporphyrin IX monomethyl ester oxidative cyclase-related protein and subunits of a Ni-chelatase for the biosynthesis of the Ni-containing coenzyme F430, which is essential for the production of methane in methanogens	COG 1032	[C]
0896	844704	846110	-	468		Fe-S oxidoreductase fused to a metal-binding domain	COG 4001 & COG 0535	[R][R]
0897	846128	847237	-	369	ThiH_1	Predicted enzyme related to thiamine biosynthesis enzyme ThiH	COG 1060	[HR]
0898	847218	848360	-	380	ThiH_2	Predicted enzyme related to thiamine biosynthesis enzyme ThiH	COG 1060	[HR]
0899	848389	851631	+	1080	IleS	Isoleucyl-tRNA synthetase	COG 0060	[J]
0900	851628	854384	+	918	AlaS	Alanyl-tRNA synthetase	COG 0013	[J]
0901	854758	856533	-	591	NrdD	Oxygen-sensitive ribonucleoside-triphosphate reductase	COG 1328	[F]
0902	856681	858303	-	540		Uncharacterized protein		
0903	858399	858818	+	139		Ferredoxin	COG 1145	[C]
0904	858815	859825	+	336		Predicted protease of the collagenase family	COG 0826	[O]
0905	859827	860189	+	120		Predicted metal-binding protein		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0906	860186	860890	+	234		Predicted protease of the collagenase family	COG0826	[O]
0907	860862	862367	-	501		predicted regulatory protein consisting of an uncharacterized conserved domain fused to a CBS domain	COG1900 & COG0517	[S][R]
0908	862342	863466	-	374	Thil2	ATP pyrophosphatase involved in thiamine biosynthesis	COG0301	[H]
0909	863512	864411	+	299		Uncharacterized conserved protein	COG2013	[S]
0910	864567	866477	-	636		Predicted membrane protein, MK-44 family		
0911	866594	868288	-	564	CarB2	Carbamoylphosphate synthase large subunit	COG0458	[EF]
0912	868674	869447	+	257		Uncharacterized protein		
0913	869366	870883	+	505		Predicted membrane protein		
0914	870784	873003	-	739		Predicted membrane protein, MK-44 family		
0915	872967	873524	-	185		Uncharacterized protein		
0916	873521	874090	-	189		Predicted membrane protein		
0917	874490	875560	-	356		Nucleoside-diphosphate-sugar pyrophosphorylase involved in lipopolysaccharide biosynthesis/translation initiation factor eIF2B subunit	COG1208	[MJ]
0918	875582	876487	-	301	AgaS	Predicted phosphosugar isomerase	COG2222	[M]
0919	876477	876932	-	151		Uncharacterized membrane protein	COG2246	[S]
0920	876957	878327	+	456	CpsG2	Phosphomannomutase	COG1109	[G]
0921	878332	879759	+	475	Top6B	DNA topoisomerase VI, subunit B	COG1389	[L]
0922	880054	881355	+	433		Uncharacterized protein specific for M.kandleri, MK-19 family		
0923	881345	881530	-	61		Uncharacterized protein		
0924	882370	883326	+	318		Uncharacterized protein conserved in archaea	COG3366	[S]
0925	883220	884197	-	325		Uncharacterized protein specific for M.kandleri, MK-36 family		



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0926	884 275	885 705	+	476	MurE_1	UDP-N-acetylmuramyl tripeptide synthase	COG 0769	[M]
0927	885 706	886 470	+	254		Uncharacterized protein conserved in archaea		
0928	886 477	887 508	+	343	PflX	Uncharacterized Fe-S protein PflX, homolog of pyruvate formate lyase activating protein	COG 1313	[R]
0929	887 505	888 422	-	305		Coenzyme F420-reducing hydrogenase, beta subunit	COG 1035	[C]
0930	888 425	889 183	-	252		Coenzyme F420-reducing hydrogenase, gamma subunit	COG 1941	[C]
0931	889 351	890 601	-	416		Coenzyme F420-reducing hydrogenase, alpha subunit	COG 3259	[C]
0932	890 735	892 306	+	523		Fe-S oxidoreductase family protein	COG 1032	[C]
0933	892 458	893 501	-	347		Predicted hydrolase of the metallo-beta-lactamase superfamily, contains a Zn-ribbon		
0934	893 506	894 342	-	278	KsgA	Dimethyladenosine transferase (rRNA methylase)	COG 0030	[J]
0935	894 329	895 165	-	278		Predicted RNA-binding protein, contains THUMP domain	COG 2131 & COG 1818	[F][R]
0936	895 204	895 467	+	87		CBS-domain-containing protein	COG 0517	[R]
0937	895 592	896 863	-	423		Uncharacterized protein specific for M.kandleri, MK-21 family		
0938	896 885	897 463	-	192	Isf	Iron-sulfur flavoprotein similar to Multimeric flavodoxin WrbA	COG 0655	[R]
0939	897 491	898 330	+	279		Uncharacterized protein conserved in archaea	COG 1650	[S]
0940	898 801	899 631	-	276		Predicted SAM-dependent methyltransferase	COG 2520	[R]
0941	899 633	900 397	-	254		Phosphate acetyltransferase family enzyme	COG 4002	[R]
0942	901 574	902 758	+	394	ArgG	Argininosuccinate synthase	COG 0137	[E]
0943	902 832	903 947	-	371		ABC-type multidrug transport system, permease subunit	COG 0842	[M]
0944	903 932	904 639	-	235		ABC-type multidrug transport system, ATPase subunit	COG 1131	[M]
0945	904 797	905 420	-	207		Uncharacterized protein specific for M.kandleri, MK-1 family		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0946	905879	906190	+	103		Uncharacterized membrane protein specific for M.kandleri, MK-4 family		
0947	906696	908201	+	501		Uncharacterized secreted protein specific for M.kandleri, contains repeats, MK-5 family		
0948	908194	910293	+	699		Uncharacterized protein specific for M.kandleri, MK-5 family		
0949	910269	911270	+	333		Predicted membrane protein		
0950	911951	912499	-	182		Predicted phosphatase homologous to the C-terminal domain of histone macroH2A1	COG 2110	[R]
0951	912898	913887	+	329	EC M272	Ca <sup>2+</sup> /Na <sup>+</sup> antiporter	COG 0530	[P]
0952	914028	915068	+	346		Pyruvate-formate lyase-activating enzyme	COG 1180	[O]
0953	915262	916077	+	271	UbiA	4-hydroxybenzoate polyprenyltransferase	COG 0382	[H]
0954	916066	917193	-	375		Archaeal fructose 1,6-bisphosphatase	COG 1980	[G]
0955	917240	917590	-	116	EGD2	Transcription factor homologous to NACalpha-BTF3	COG 1308	[K]
0956	917639	918091	-	150		Prefoldin, molecular chaperone implicated in de novo protein folding, alpha subunit	COG 1370	[O]
0957	918107	919444	+	445	TldD	Predicted Zn-dependent protease of TldD family	COG 0312	[R]
0958	919444	920673	+	409	PmbA	Inactivated homologs of predicted Zn-dependent protease of TldD family (PmbA subfamily protein)	COG 0312	[R]
0959	920942	921322	+	126		Uncharacterized protein		
0960	921362	922747	+	461	GatB	Asp-tRNAAsn/Glu-tRNA <sup>Gln</sup> amidotransferase B subunit (PET112 homolog)	COG 0064	[J]
0961	922744	923442	-	232	SpeE	Spermidine synthase or similar enzyme that uses putrescine	COG 0421	[E]
0962	923454	923702	+	82		Uncharacterized protein conserved in archaea	COG 4003	[S]
0963	923724	924575	+	283		Predicted dioxygenase	COG 1355	[R]
0964	924582	925004	+	140		Uncharacterized membrane protein		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0965	925021	926991	+	656	MC M2_1	Predicted ATPase involved in replication control, Cdc46/Mcm family	COG 1241	[L]
0966	926988	927662	+	224		Uncharacterized protein conserved in archaea	COG 3390	[S]
0967	927666	928082	+	138	GC D7	Translation initiation factor eIF-2	COG 1601	[J]
0968	928083	928427	+	114		Uncharacterized conserved protein	COG 2412	[S]
0969	928424	929482	+	352		Predicted N6-adenine-specific RNA methylase containing THUMP domain	COG 0116	[L]
0970	929468	930193	-	241		Predicted hydrolase of the HAD superfamily	COG 1011	[R]
0971	930168	930926	+	252		Uncharacterized conserved protein	COG 1478	[S]
0972	931280	932956	+	558		Uncharacterized protein specific for M.kandleri, MK-8 family		
0973	932946	934205	+	419		Uncharacterized protein specific for M.kandleri with repeats, MK-6 family		
0974	934272	935483	+	403	Thr C	Threonine synthase	COG 0498	[E]
0975	935967	936332	-	121		Uncharacterized conserved protein		
0976	936332	938134	+	600		Predicted membrane protein	COG 3356	[S]
0977	938193	939227	+	344		Glycosyl transferase, related to UDP-glucuronosyltransferase	COG 1819	[GC]
0978	939220	939801	+	193	SEC 59	Dolichol kinase	COG 0170	[I]
0979	939803	940735	+	310		Uncharacterized membrane protein specific for M.kandleri, MK-15 family		
0980	941177	942388	-	403		Predicted Fe-S oxidoreductase	COG 0535	[R]
0981	942395	943513	-	372		Predicted membrane-associated Zn-dependent protease	COG 0750	[M]
0982	943478	944167	+	229		Predicted nucleotidyltransferase of the DNA polymerase beta superfamily	COG 2413	[R]
0983	944171	944794	+	207		Predicted archaea-specific RNA-binding protein containing a C-terminal EMAP domain	COG 2517	[R]
0984	944800	945213	+	137		Transcriptional regulator containing DNA-binding HTH domain	COG 1846	[K]
0985	945361	945537	-	58		Uncharacterized protein		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
0986	945634	947301	+	555	LysS	Lysyl-tRNA synthetase (class I)	COG1384	[J]
0987	947313	948383	+	356		Fe-S protein related to pyruvate formate-lyase activating enzyme	COG2108	[R]
0988	948365	948892	+	175		Uncharacterized protein		
0989	948921	950180	+	419		Predicted Fe-S oxidoreductase	COG2100	[R]
0990	950200	950649	+	149	RpsS	Ribosomal protein S19	COG0185	[J]
0991	950650	951324	-	224		Uncharacterized protein		
0992	951376	952827	+	483		Fe-S oxidoreductase similar to Mg-protoporphyrin IX monomethyl ester oxidative cyclase-related protein and subunits of a Ni-chelatase for the biosynthesis of the Ni-containing coenzyme F430, which is essential for the production of methane in methanogens	COG1032	[C]
0993	952778	953764	-	328	ERG12	Mevalonate kinase	COG1577	[I]
0994	953789	954649	+	286		Uncharacterized protein conserved in archaea	COG1667	[S]
0995	954953	956260	+	435	MurD_1	UDP-N-acetylmuramoylalanine-D-glutamate ligase	COG0771	[M]
0996	956267	957001	+	244		Archaea-specific enzyme of the ATP-grasp superfamily	COG1938	[R]
0997	957063	957452	+	129		Uncharacterized conserved protein	COG1935	[S]
0998	957638	958237	+	199		Predicted cysteine protease of the transglutaminase-like superfamily	COG1305	[E]
0999	958234	959913	-	559	CDC9	ATP-dependent DNA ligase	COG1793	[L]
1000	960189	961070	+	293		Predicted serine/threonine protein kinase	COG0478	[T]
1001	961247	962146	+	299		Ferredoxin	COG1145	[C]
1002	962187	962981	+	264	MhpD	2-keto-4-pentenoate hydratase hydratase	COG0179	[Q]
1003	963347	964648	-	433		Predicted DNA-binding protein containing a Zn-ribbon	COG1571	[R]
1004	964675	964869	+	64		Uncharacterized protein		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1005	964874	965851	+	325		Predicted transcriptional regulator containing a cHTH DNA-binding domain	COG1395	[K]
1006	965913	967550	+	545	GroL	HSP60 family chaperonin	COG0459	[O]
1007	967621	967887	-	88		Uncharacterized archaeal membrane protein	COG2034	[S]
1008	967906	968730	+	274	SecF	Preprotein translocase subunit SecF	COG0341	[U]
1009	968734	969945	+	403	SecD	Preprotein translocase subunit SecD	COG0342	[U]
1010	969971	971443	+	490	TrkG	Membrane subunit of a Trk-type K <sup>+</sup> transport system	COG0168	[P]
1011	971489	972157	+	222	TrkA	NAD-binding component of a K <sup>+</sup> transport system	COG0569	[P]
1012	972487	974457	+	656	NtpI	Archaeal/vacuolar-type H <sup>+</sup> -ATPase subunit I	COG1269	[C]
1013	974472	977537	+	1021	NtpK	Archaeal/vacuolar-type H <sup>+</sup> -ATPase subunit K	COG0636	[C]
1014	977572	978174	+	200	NtpE	Archaeal/vacuolar-type H <sup>+</sup> -ATPase subunit E	COG1390	[C]
1015	978178	979302	+	374	NtpC	Archaeal/vacuolar-type H <sup>+</sup> -ATPase subunit C	COG1527	[C]
1016	979315	979653	+	112	NtpF	Archaeal/vacuolar-type H <sup>+</sup> -ATPase subunit F	COG1436	[C]
1017	979665	981443	+	592	NtpA	Archaeal/vacuolar-type H <sup>+</sup> -ATPase subunit A	COG1155	[C]
1018	981484	982095	+	203		Uncharacterized conserved protein	COG1901	[S]
1019	982627	982932	-	101		Uncharacterized conserved protein	COG0011	[S]
1020	982920	983942	-	340		Uncharacterized protein		
1021	983976	984734	+	252		Sugar phosphate isomerase/epimerase	COG1082	[G]
1022	984769	984969	-	66		Predicted RNA-binding protein, contains TRAM domain	COG3269	[R]
1023	985170	985793	-	207		Acyl-CoA synthetase (NDP forming)	COG1042	[C]
1024	985790	986929	-	379		Pyridoxal-phosphate-dependent aminotransferase	COG0436	[E]
1025	986956	987471	+	171		Predicted transcriptional regulator of amino acid metabolism consisting of an ACT domain and a DNA-binding HTH domain		

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1026	987473	988462	+	329		Uncharacterized conserved protein	COG2419	[S]
1027	988455	989405	+	316		Pyruvate-formate lyase-activating enzyme	COG1180	[O]
1028	989456	989920	+	154		ADP-ribose pyrophosphatase	COG1051	[F]
1029	989917	990534	+	205		Uncharacterized protein		
1030	990746	991507	+	253	DnaN	DNA polymerase sliding clamp (PCNA)	COG0592	[L]
1031	991571	992038	-	155	LepB	Type I signal peptidase	COG0681	[U]
1032	992204	993154	+	316	RadA_1	RadA recombinase	COG0468	[L]
1033	993238	994077	-	279		Metal-dependent hydrolase of the beta-lactamase superfamily	COG1234	[R]
1034	994067	995521	-	484		Uncharacterized protein		
1035	995608	998340	+	910	Lhr	Lhr-like Superfamily II helicase	COG1201	[R]
1036	998337	999296	-	319		Uncharacterized protein specific for M.kandleri, MK-38 family		
1037	999306	999872	-	188	CobL_1	Precorrin-6B methylase	COG2242	[H]
1038	999865	1000527	+	220	CobF	Precorrin-2 methylase	COG2243	[H]
1039	1000589	1003081	+	830	PolB	B family DNA polymerase	COG0417	[L]
1040	1003150	1004791	+	546		Fe-S oxidoreductase	COG1031	[C]
1041	1004793	1009553	-	1586		Predicted protein of the CobN/Mg-chelatase family	COG1429	[H]
1042	1009534	1009770	-	78		Uncharacterized protein		
1043	1010030	1010881	+	283		Squalene cyclase	COG1657	[I]
1044	1010902	1011384	+	160		Uncharacterized protein		

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1045	1011565	1013082	+	505		Uncharacterized protein		
1046	1013137	1013823	-	228		L-alanine-DL-glutamate epimerase and related enzymes of enolase superfamily	COG 4948	[MR]
1047	1013993	1015405	+	470	MurD_2	UDP-N-acetylmuramoylalanine-D-glutamate ligase	COG 0771	[M]
1048	1015395	1016936	+	513	HyuB	N-methylhydantoinase B	COG 0146	[EQ]
1049	1016944	1017231	+	95		Predicted pyrophosphatase	COG 1694	[R]
1050	1017228	1018340	+	370		Predicted metal-dependent hydrolase related to cytosine deaminase	COG 0402	[FR]
1051	1018337	1018726	+	129		Predicted nucleotide-binding protein related to universal stress protein, UspA	COG 0589	[T]
1052	1018718	1020367	-	549	ELP3	ELP3 component of the RNA polymerase II complex, consists of an N-terminal BioB/LipA-like domain and a C-terminal histone acetylase domain	COG 1243	[KB]
1053	1020723	1021256	+	177		Zn-dependent protease	COG 1994	[R]
1054	1021422	1022354	-	310		Predicted ATPase of the PP-loop superfamily implicated in cell cycle control	COG 0037	[D]
1055	1022751	1023809	+	352		Predicted deacetylase	COG 0123	[BQ]
1056	1024357	1026507	-	716		Predicted exporter of the RND superfamily	COG 1033	[R]
1057	1026786	1027487	+	233		Zn-ribbon-containing-protein		
1058	1027491	1028459	+	322		Fe-S oxidoreductase	COG 4004 & COG 0731	[S][C]



SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1059	1028450	1028851	-	133		Uncharacterized membrane protein		
1060	1028915	1029487	+	190		Predicted nucleotide kinase related to CMP and AMP kinase	COG 1936	[F]
1061	1029500	1030444	+	314		Acetyltransferase (the isoleucine patch superfamily)	COG 0110	[R]
1062	1030519	1031127	+	202	PDX2	Predicted glutamine amidotransferase involved in pyridoxine biosynthesis	COG 0311	[H]
1063	1031140	1032081	+	313	GltB <sub>2</sub>	Glutamate synthase subunit 1	COG 0067	[E]
1064	1032078	1032770	+	230	GltB <sub>3</sub>	Glutamate synthase subunit 3	COG 0070	[E]
1065	1032777	1033466	+	229		Predicted PP-loop superfamily ATPase	COG 0603	[R]
1066	1033579	1033920	+	113		Uncharacterized protein		
1067	1033966	1035177	+	403		Predicted SAM-dependent methyltransferase	COG 1092	[R]
1068	1035174	1036619	-	481		Uncharacterized membrane protein specific for M.kandleri, MK-25 family		
1069	1036609	1037562	-	317	Mdh	NADPH-dependent L-malate dehydrogenase	COG 0039	[C]
1070	1037571	1038509	-	312	ArgF	Ornithine carbamoyltransferase	COG 0078	[E]
1071	1038509	1039858	-	449	PurD	Phosphoribosylamine-glycine ligase	COG 0151	[F]
1072	1039833	1040384	-	183	PyrE	Orotate phosphoribosyltransferase	COG 0461	[F]
1073	1040378	1040899	-	173	CdsA	CDP-diglyceride synthetase	COG 0575	[I]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1074	1040918	1042417	+	499		Predicted Fe-S oxidoreductase	COG1964	[R]
1075	1042423	1043175	+	250	SIR2	NAD-dependent protein deacetylase, SIR2 family	COG0846	[K]
1076	1043739	1044446	-	235		Uncharacterized Rossmann fold enzyme	COG1634	[R]
1077	1044460	1045491	+	343	ArgC	Acetylglutamate semialdehyde dehydrogenase	COG0002	[E]
1078	1045573	1046004	-	143		Predicted hydrocarbon binding protein (contains V4R domain)	COG1719	[R]
1079	1046073	1046807	-	244		Metal-dependent hydrolases of the beta-lactamase superfamily II	COG1237	[R]
1080	1047394	1047978	+	194	MobB	Molybdopterin-guanine dinucleotide biosynthesis protein	COG1763	[H]
1081	1048183	1049454	-	423	MiaB	2-methylthioadenine synthetase	COG0621	[J]
1082	1049460	1050929	-	489		Uncharacterized membrane protein specific for M.kandleri, MK-16 family		
1083	1050955	1052430	-	491		Predicted glycosyltransferase	COG0438	[M]
1084	1052589	1054142	-	517		Queuine tRNA-ribosyltransferase, contains RNA-binding PUA domain	COG1549	[J]
1085	1054126	1055544	-	472	PurB	Adenylosuccinate lyase	COG0015	[F]
1086	1055634	1056806	-	390		Ferredoxin domain fused to pyruvate-formate lyase-activating enzyme	COG1145 & COG0535	[C][R]
1087	1056850	1057029	-	59		Nitrogen regulatory protein PII homolog	COG0347	[E]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1088	1057581	1058501	+	306		Uncharacterized protein conserved in archaea	COG3366	[S]
1089	1058600	1058881	+	93	Ssh10b_2	Archaea-specific DNA-binding protein	COG1581	[K]
1090	1058918	1059742	+	274		CBS-domain-containing protein	COG0517	[R]
1091	1059786	1061828	+	680	Hya_1	N-methylhydantoinase A	COG0145	[EQ]
1092	1061983	1062237	+	84		Uncharacterized protein		
1093	1062427	1063875	-	482	Hya_2	N-methylhydantoinase A	COG0145	[EQ]
1094	1063943	1064371	-	142		Uncharacterized domain specific for M.kandleri, MK_11		
1095	1064771	1065691	-	306		Uncharacterized protein		
1096	1066239	1067360	-	373		Uncharacterized protein specific for M.kandleri, MK-7 family		
1097	1067565	1067867	-	100		Uncharacterized protein specific for M.kandleri, MK-45 family		
1098	1067881	1068231	-	116		Uncharacterized protein specific for M.kandleri, MK-35 family		
1099	1068430	1069563	-	377		Uncharacterized protein specific for M.kandleri, MK-7 family		
1100	1070068	1071114	+	348		Predicted extracellular polysaccharide hydrolase of the endo alpha-1,4 polygalactosaminidase family	COG2342	[G]
1101	1071283	1072530	+	415		Uncharacterized protein specific for M.kandleri, MK-32 family		
1102	1072764	1073159	-	131	Fur_1	Predicted transcriptional regulator containing a HTH DNA-binding domain	COG0640	[K]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1103	1073510	1074421	+	303		Predicted ATPase of the PP-loop superfamily implicated in cell cycle control	COG0037	[D]
1104	1074418	1075152	-	244		Uncharacterized membrane protein specific for M.kandleri, MK-4 family		
1105	1075156	1076343	-	395		Uncharacterized conserved protein	COG1641	[S]
1106	1076417	1076743	+	108		Nitrogen regulatory protein PII homolog	COG4075	[S]
1107	1076740	1077711	-	323		Predicted metabolic regulator containing two V4R domains	COG1719	[R]
1108	1077887	1079302	-	471		NAD-dependent aldehyde dehydrogenase	COG1012	[C]
1109	1079336	1080184	-	282		Uncharacterized protein		
1110	1080370	1081089	-	239		Uncharacterized protein		
1111	1081197	1082513	+	438		Uncharacterized protein		
1112	1082635	1084164	-	509		Uncharacterized protein specific for M.kandleri, MK-8 family		
1113	1084374	1084985	-	203		Uncharacterized protein specific for M.kandleri, MK-22 family		
1114	1085323	1086447	-	374		Uncharacterized secreted protein specific for M.kandleri with repeats, MK-6 family		
1115	1086530	1088314	-	594		Uncharacterized secreted protein specific for M.kandleri with repeats, MK-6 family		
1116	1088392	1090035	-	547		Uncharacterized protein specific for M.kandleri, MK-8 family		
1117	1090497	1090760	-	87		Uncharacterized protein		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1118	1090917	1091960	-	347		Uncharacterized protein		
1119	1091917	1092153	-	78		Uncharacterized protein		
1120	1092364	1093884	-	506	MC M2_2	Predicted ATPase involved in replication control, Cdc46/Mcm family	COG 1241	[L]
1121	1095025	1095999	+	324		Uncharacterized protein specific for M.kandleri, MK-23 family		
1122	1096289	1097245	+	318	Hmd III	N5,N10-methylenetetrahydromethanopterin dehydrogenase (H2-forming)	COG 4007	[R]
1123	1097550	1097834	-	94		Uncharacterized protein conserved in archaea		
1124	1098197	1099186	+	329		Uncharacterized membrane protein		
1125	1099190	1100172	-	327		Predicted extracellular polysaccharide hydrolase of the Endo alpha-1,4 polygalactosaminidase family	COG 2342	[G]
1126	1101061	1101891	-	276	FtsZ_3	FtsZ GTPase involved in cell division	COG 0206	[D]
1127	1102191	1102478	+	95		Predicted membrane protein		
1128	1102596	1103690	-	364		Permease of the major facilitator superfamily	COG 0477	[GE PR]
1129	1104523	1105320	+	265		Predicted protease or amidase	COG 0693	[R]
1130	1105400	1105687	+	95		Uncharacterized protein		
1131	1107532	1108419	-	295		Uncharacterized protein specific for M.kandleri, MK-23 family		
1132	1109620	1110027	+	135		Uncharacterized conserved protein related to C-terminal domain of eukaryotic chaperone, SACSIN	COG 2250	[S]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1133	1110240	1110470	-	76		Uncharacterized protein		
1134	1113424	1114281	+	285		Uncharacterized protein		
1135	1114332	1115444	+	370		Permease of the major facilitator superfamily	COG 0477	[GE PR]
1136	1115624	1116253	+	209		Uncharacterized protein specific for M.kandleri, MK-1 family		
1137	1116295	1116663	-	122		Predicted nucleotidyltransferase of the DNA polymerase beta superfamily	COG 1708	[R]
1138	1116684	1116905	+	73		Uncharacterized conserved protein related to C-terminal domain of eukaryotic chaperone, SACSIN	COG 2250	[S]
1139	1116898	1117071	+	57		Uncharacterized protein		
1140	1117134	1117373	-	79		Uncharacterized protein		
1141	1117370	1117810	-	146		Uncharacterized membrane protein specific for M.kandleri, MK-17 family		
1142	1117919	1118431	-	170		Uncharacterized protein specific for M.kandleri, MK-22 family		
1143	1119001	1119915	-	304		Uncharacterized protein		
1144	1120281	1121489	-	402		Predicted membrane protein		
1145	1122067	1122807	+	246		Predicted membrane protein		
1146	1122763	1123665	-	300		Uncharacterized membrane protein specific for M.kandleri, MK-9 family		
1147	1125171	1125659	-	162		Uncharacterized protein specific for M.kandleri, MK-5 family		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1148	1125923	1130821	+	1632		Uncharacterized secreted protein specific for M.kandleri with repeats, MK-5 family		
1149	1130814	1136363	+	1849		Uncharacterized secreted protein specific for M.kandleri with repeats, MK-5 family		
1150	1136364	1137101	+	245		Predicted membrane protein		
1151	1137105	1137752	+	215		Predicted membrane protein		
1152	1138095	1138991	+	298		Uncharacterized membrane protein specific for M.kandleri, MK-9 family		
1153	1139217	1139651	+	144		Predicted membrane protein		
1154	1139945	1141204	+	419		Uncharacterized membrane protein specific for M.kandleri, MK-9 family		
1155	1141640	1142470	+	276		Uncharacterized membrane protein		
1156	1142499	1142942	+	147		Uncharacterized protein specific for M.kandleri, MK-24 family		
1157	1143512	1144135	-	207		Uncharacterized protein specific for M.kandleri, MK-1 family		
1158	1144383	1145600	-	405		Uncharacterized membrane protein specific for M.kandleri, MK-9 family		
1159	1145844	1146677	+	277		Uncharacterized membrane protein specific for M.kandleri, MK-26 family		
1160	1146822	1147688	+	288		Uncharacterized membrane protein specific for M.kandleri, MK-26 family		
1161	1148015	1148680	+	221		Uncharacterized membrane protein specific for M.kandleri, MK-9 family		
1162	1148705	1149403	+	232		Uncharacterized membrane protein specific for M.kandleri, MK-17 family		



SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1163	1149695	1150318	-	207		Uncharacterized protein specific for M.kandleri, MK-1 family		
1164	1151111	1151647	-	178		Thermonuclease	COG 1525	[L]
1165	1151966	1152913	-	315		Uncharacterized protein		
1166	1152967	1154208	-	413		Uncharacterized conserved protein	COG 3287	[S]
1167	1155432	1156157	+	241		Uncharacterized protein		
1168	1156220	1157155	+	311		Uncharacterized secreted protein specific for M.kandleri, MK-6 family		
1169	1158073	1158933	-	286		Uncharacterized protein		
1170	1160085	1161410	-	441		Fusion of at least two uncharacterized domain specific for M.kandleri, MK-12 family		
1171	1161703	1162374	-	223		Predicted membrane-bound metal-dependent hydrolase	COG 1988	[R]
1172	1162560	1163432	+	290		Uncharacterized protein		
1173	1163540	1164262	+	240		Uncharacterized protein specific for M.kandleri, MK-27 family		
1174	1165552	1166187	+	211		Predicted membrane protein		
1175	1167028	1167396	-	122		Uncharacterized protein		
1176	1167393	1167758	-	121		Uncharacterized protein		
1177	1168689	1171121	+	810		Protein containing a metal-binding domain shared with formylmethanofuran dehydrogenase subunit E		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1178	1174	117410	+	968		Uncharacterized protein conserved in archaea		
1179	117410	117454	-	146		Uncharacterized protein		
1180	117474	117569	-	317		Uncharacterized protein		
1181	117604	117694	+	299		Uncharacterized protein specific for M.kandleri, MK-7 family		
1182	117707	117778	-	238		Uncharacterized protein specific for M.kandleri, MK-27 family		
1183	117857	117935	-	262		Polyferredoxin	COG 0348	[C]
1184	117946	117985	-	131		Uncharacterized protein		
1185	117990	118026	-	118		Uncharacterized protein		
1186	118179	118202	+	77		Uncharacterized protein specific for M.kandleri, MK-20 family		
1187	118251	118349	+	325		Predicted extracellular polysaccharide hydrolase of the endo alpha-1,4 polygalactosaminidase family	COG 2342	[G]
1188	118348	118393	+	147		Uncharacterized protein		
1189	118410	118580	-	568		ATPase subunit of an ABC-type transport system, contains a duplicated ATPase domain	COG 1123	[R]
1190	118574	118621	-	156		Uncharacterized protein		
1191	118619	118680	+	201		Membrane-associated phospholipid phosphatase	COG 0671	[I]
1192	118678	118752	+	248		Uncharacterized conserved protein	COG 0327	[S]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1193	1187747	1189015	+	422		Predicted phosphoglycerate mutase, AP superfamily	COG 3635	[G]
1194	1189020	1189562	+	180		Predicted membrane protein	COG 1238	[S]
1195	1189569	1190054	+	161	PurE	Phosphoribosylcarboxyaminoimidazole (NCAIR) mutase	COG 0041	[F]
1196	1190035	1190634	-	199	CobH	Precorrin isomerase	COG 2082	[H]
1197	1190631	1192280	-	549	IlvD	Dihydroxyacid dehydratase	COG 0129	[EG]
1198	1192330	1192938	+	202		Integral membrane protein of the MarC family	COG 2095	[U]
1199	1192943	1194109	+	388		Predicted GTPase of the OBG/HflX superfamily	COG 1163	[R]
1200	1194106	1194801	+	231		Uncharacterized, MobA-related protein	COG 2068	[R]
1201	1194798	1194998	-	66	TatA	Sec-independent protein secretion pathway component	COG 1826	[U]
1202	1195047	1195664	-	205	HyaB	Ni,Fe-hydrogenase I large subunit	COG 0374	[C]
1203	1195681	1196247	-	188		Uncharacterized protein		
1204	1196692	1196952	-	86		Uncharacterized protein		
1205	1196967	1197401	-	144		Uncharacterized protein		
1206	1197474	1197980	-	168	LeuD_2	3-isopropylmalate dehydratase small subunit	COG 0066	[E]
1207	1197964	1198437	-	157		Predicted membrane protein	COG 3431	[S]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1208	1198443	1199651	-	402	Leu C_2	3-isopropylmalate dehydratase large subunit	COG 0065	[E]
1209	1200171	1201364	-	397	Leu A	Isopropylmalate synthase	COG 0119	[E]
1210	1201369	1201722	-	117		Uncharacterized conserved protein	COG 1993	[S]
1211	1201704	1202099	-	131	Crc B	Integral membrane protein possibly involved in chromosome condensation	COG 0239	[D]
1212	1202106	1202915	-	269		Uncharacterized bacitracin resistance protein	COG 1968	[V]
1213	1203140	1203412	+	90		Predicted metabolic regulator containing an ACT domain	COG 3830	[T]
1214	1203418	1204770	+	450		Uncharacterized conserved protein	COG 2848	[S]
1215	1204838	1205845	+	335	Leu B_2	Isopropylmalate dehydrogenase	COG 0473	[E]
1216	1206266	1206589	+	107	POP 4_2	RNAse P subunit P29	COG 1588	[J]
1217	1206586	1206942	+	118	Rps Q	Ribosomal protein S17	COG 0186	[J]
1218	1206955	1207356	+	133	Rpl N	Ribosomal protein L14	COG 0093	[J]
1219	1207371	1207820	+	149	RplX	Ribosomal protein L24	COG 0198	[J]
1220	1207835	1208617	+	260	RPS 4A	Ribosomal protein S4E	COG 1471	[J]
1221	1208630	1209190	+	186	RplE	Ribosomal protein L5	COG 0094	[J]
1222	1209205	1209351	+	48	Rps N	Ribosomal protein S14	COG 0199	[J]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1223	1209368	1209760	+	130	RpsH	Ribosomal protein S8	COG0096	[J]
1224	1209774	1210388	+	204	RplF	Ribosomal protein L6	COG0097	[J]
1225	1210401	1210796	+	131	RPL32	Ribosomal protein L32E	COG1717	[J]
1226	1210813	1211850	-	345	PurM	Phosphoribosylaminoimidazol (AIR) synthetase	COG0150	[F]
1227	1211864	1213822	-	652		Predicted metal-dependent RNase, consists of a metallo-beta-lactamase domain and an RNA-binding KH domain	COG1782	[R]
1228	1213888	1214520	-	210	HsIV_2	Protease subunit of the proteasome	COG0638	[O]
1229	1214563	1216020	-	485	ProS	Prolyl-tRNA synthetase	COG0442	[J]
1230	1215994	1217055	+	353	GldA	Glycerol dehydrogenase	COG0371	[C]
1231	1217045	1217704	-	219	SlpA	FKBP-type peptidyl-prolyl cis-trans isomerase	COG1047	[O]
1232	1217710	1218660	-	316	SufB	ABC-type transport system involved in Fe-S cluster assembly, permease component	COG0719	[O]
1233	1218618	1219331	-	237	SufC	ABC-type transport system involved in Fe-S cluster assembly, ATPase component	COG0396	[O]
1234	1219555	1220589	+	344		Uncharacterized protein		
1235	1220565	1221341	-	258		Predicted endonuclease of the RecB family	COG4998	[L]
1236	1221500	1222936	-	478		Acetolactate synthase large subunit homolog	COG0028	[EH]
1237	1222933	1223619	-	228		Predicted DNA-binding protein containing PIN domain	COG1458	[R]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1238	122361	122431	-	232		Uncharacterized protein		
1239	122438	122516	-	259		MinD superfamily P-loop ATPase containing an inserted ferredoxin domain	COG 1149	[C]
1240	122518	122597	-	262		MinD superfamily P-loop ATPase containing an inserted ferredoxin domain	COG 1149	[C]
1241	122597	122630	-	109		Uncharacterized conserved protein	COG 1433	[S]
1242	122630	122654	-	79		Zn-ribbon-containing protein		
1243	122655	122673	-	60		Ferredoxin	COG 1145	[C]
1244	122676	122717	-	136		Uncharacterized protein conserved in archaea		
1245	122725	122762	+	122		CBS-domain	COG 0517	[R]
1246	122762	122896	+	446		Acyl-CoA synthetase (NDP forming)	COG 1042	[C]
1247	122899	122923	+	79	Feo A	Ferrous ion uptake system subunit	COG 1918	[P]
1248	122924	123119	+	650	Feo B	Ferrous ion uptake system subunit, predicted GTPase	COG 0370	[P]
1249	123175	123213	-	125		Rubrerythrin	COG 1592	[C]
1250	123245	123298	-	177		Uncharacterized membrane protein		
1251	123437	123541	-	346		Uncharacterized protein		
1252	123623	123691	-	225		Uncharacterized protein specific for M.kandleri, MK-1 family		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1253	1237175	1240579	+	1134		Uncharacterized secreted protein specific for M.kandleri, MK-28 family		
1254	1241043	1241195	+	50		Uncharacterized protein		
1255	1241416	1241982	+	188		Predicted RNA-binding protein containing PIN domain		
1256	1241966	1242934	-	322		Uncharacterized domain specific for M.kandleri, MK-34 family		
1257	1243554	1244471	-	305		Uncharacterized protein		
1258	1244552	1245679	+	375		Predicted hydrolase of the metallo-beta-lactamase superfamily fused to a uncharacterized domain	COG 0595	[R]
1259	1245681	1248527	-	948		Adenine-specific DNA methylase containing a Zn-ribbon	COG 1743	[L]
1260	1248593	1250761	+	722		Predicted ATPase of the AAA+ class	COG 1483	[R]
1261	1253762	1254154	+	130	Fur <sub>2</sub>	Fe <sup>2+</sup> /Zn <sup>2+</sup> uptake regulator similar to transcriptional regulators	COG 0640	[K]
1262	1254244	1255155	+	303		ATPase involved in chromosome partitioning	COG 1192	[D]
1263	1255170	1255841	+	223		Uncharacterized protein specific for M.kandleri, MK-29 family		
1264	1255904	1257532	+	542		Uncharacterized protein specific for M.kandleri, MK-37 family		
1265	1257546	1258277	+	243		Uncharacterized protein		
1266	1258311	1259615	+	434		Uncharacterized protein specific for M.kandleri, MK-37 family		
1267	1259840	1261165	+	441		Uncharacterized protein specific for M.kandleri, MK-37 family		



SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1268	1261784	1263256	-	490		Uncharacterized secreted protein specific for M.kandleri, MK-28 family		
1269	1264021	1264473	+	150		Uncharacterized protein specific for M.kandleri, MK-1 family		
1270	1264935	1265888	-	317		Uncharacterized protein		
1271	1266112	1267695	-	527		Uncharacterized protein		
1272	1267711	1269366	-	551		Uncharacterized protein		
1273	1269348	1270529	-	393		Uncharacterized secreted protein specific for M.kandleri, MK-5 family		
1274	1270586	1271590	-	334		Predicted hydrolase of the metallo-beta-lactamase superfamily	COG 0595	[R]
1275	1271731	1272240	-	169		Uncharacterized protein conserved in archaea	COG 1795	[S]
1276	1272292	1273644	-	450		Fusion of at least two uncharacterized domain specific for M.kandleri, MK-12 family		
1277	1274035	1274772	+	245		Uncharacterized protein specific for M.kandleri, MK-14 family		
1278	1275808	1277502	-	564		Uncharacterized protein specific for M.kandleri, MK-19 family		
1279	1277672	1278295	+	207		Uncharacterized protein		
1280	1278820	1279008	+	62		Uncharacterized protein		
1281	1279599	1280219	-	206		Uncharacterized protein specific for M.kandleri, MK-14 family		
1282	1280956	1281933	-	325		Uncharacterized protein conserved in archaea		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1283	1282214	1283809	-	531		Fusion of at least two uncharacterized domain specific for M.kandleri, MK-2 family		
1284	1283981	1284406	-	141		Uncharacterized conserved protein related to C-terminal domain of eukaryotic chaperone, SACSIN	COG 2250	[S]
1285	1284412	1284786	+	124		Predicted nucleotidyltransferase of the DNA polymerase beta family	COG 1708	[R]
1286	1285068	1286045	+	325		Uncharacterized secreted protein specific for M.kandleri, MK-30 family		
1287	1286185	1286763	-	192		Uncharacterized protein specific for M.kandleri, MK-1 family		
1288	1287009	1287983	-	324		Uncharacterized secreted protein specific for M.kandleri, MK-3 family		
1289	1288128	1290386	+	752		Adenine-specific DNA methylase containing a Zn-ribbon	COG 1743	[L]
1290	1290370	1291122	+	250		Uncharacterized protein		
1291	1291279	1291923	-	214		Uncharacterized protein specific for M.kandleri, MK-1 family		
1292	1292092	1292835	-	247		Predicted nucleotidyltransferase of the DNA polymerase beta supefamily fused to an Uncharacterized conserved protein related to C-terminal domain of eukaryotic chaperone, SACSIN	COG 1708 & COG 2250	[R][S]
1293	1292953	1294143	+	396		Uncharacterized protein conserved in archaea	COG 4006	[S]
1294	1294371	1295660	+	429		Uncharacterized protein		
1295	1295771	1296877	-	368		Uncharacterized secreted protein specific for M.kandleri, MK-3 family		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1296	1298182	1300266	-	694		Predicted component of a thermophile-specific DNA repair system, contains two domains of the RAMP family	COG 1336 & COG 1604	[L][L]
1297	1301091	1303472	+	793		Predicted DNA-dependent DNA polymerase, component of a thermophile-specific DNA repair system	COG 1353	[R]
1298	1303469	1304803	+	444		Uncharacterized protein		
1299	1304800	1305828	+	342		Predicted component of a thermophile-specific DNA repair system, contains a RAMP domain	COG 1336	[L]
1300	1308020	1308490	-	156		Uncharacterized protein		
1301	1308525	1310213	-	562		Squalene cyclase	COG 1657	[I]
1302	1311974	1312216	+	80		Uncharacterized protein		
1303	1312185	1313237	-	350		Uncharacterized domain specific for M.kandleri, MK-11 family		
1304	1313373	1314599	-	408		Uncharacterized protein specific for M.kandleri, MK-14 family		
1305	1314596	1316125	-	509		Uncharacterized membrane protein specific for M.kandleri, MK-16 family		
1306	1316132	1317607	-	491		Predicted glycosyltransferase	COG 0438	[M]
1307	1319237	1319530	-	97		Predicted nucleotidyltransferase of the DNA polymerase beta superfamily	COG 1708	[R]
1308	1319573	1321492	-	639		Predicted P-loop ATPase		
1309	1322642	1323265	+	207		Uncharacterized protein specific for M.kandleri, MK-1 family		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1310	1324335	1324640	-	101		Uncharacterized protein predicted to be involved in DNA repair	COG 1343	[L]
1311	1324652	1326787	-	711		Homolog of the eukaryotic argonaute protein, implicated in translation or RNA processing	COG 1431	[J]
1312	1326771	1327766	-	331		Uncharacterized protein predicted to be involved in DNA repair	COG 1518	[L]
1313	1329452	1330918	-	488		Uncharacterized domain specific for M.kandleri, MK-11 family		
1314	1331274	1334015	+	913		Predicted DNA-dependent DNA polymerase, component of a thermophile-specific DNA repair system	COG 1353	[R]
1315	1334017	1334541	+	174		Uncharacterized protein predicted to be involved in DNA repair	COG 1421	[L]
1316	1334554	1335609	+	351		Predicted component of a thermophile-specific DNA repair system, contains a RAMP domain	COG 1337	[L]
1317	1335611	1336702	+	363		Uncharacterized protein		
1318	1336699	1338027	+	442		Uncharacterized protein		
1319	1338024	1339115	+	363		Predicted component of a thermophile-specific DNA repair system, contains a RAMP domain		
1320	1339214	1339987	+	257		Predicted xylanase/chitin deacetylase family enzyme	COG 0726	[G]
1321	1340038	1340202	+	54		Uncharacterized protein		
1322	1340374	1340895	+	173		Predicted membrane protein		
1323	1340890	1341540	-	216		Metal-dependent hydrolase of the beta-lactamase superfamily	COG 1237	[R]
1324	1342074	1342703	+	209		Uncharacterized membrane protein specific for M.kandleri, MK-31 family		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1325	1342985	1343332	+	115		Predicted regulator of Ras-like GTPase activity, member of the Roadblock/LC7/MglB family	COG 2018	[R]
1326	1344045	1344728	+	227		Uncharacterized domain specific for M.kandleri, MK-12 family		
1327	1344701	1345228	+	175		Uncharacterized domain specific for M.kandleri, MK-12 family		
1328	1345308	1345556	-	82		Uncharacterized protein		
1329	1345608	1346639	-	343		Uncharacterized protein specific for M.kandleri, MK-32 family		
1330	1346857	1349094	-	745		Predicted membrane protein		
1331	1349240	1350568	-	442		Uncharacterized domain specific for M.kandleri, MK-11 family		
1332	1351003	1351692	+	229		Uncharacterized protein		
1333	1351717	1352718	+	333		Uncharacterized domain specific for M.kandleri, MK-2 family		
1334	1352753	1353799	-	348		Predicted membrane-bound metal-dependent hydrolase	COG 1988	[R]
1335	1353804	1354355	-	183		Zn-dependent hydrolase	COG 0491	[R]
1336	1354689	1355963	-	424		Uncharacterized protein specific for M.kandleri, MK-42 family		
1337	1356271	1356459	-	62		Uncharacterized protein		
1338	1356793	1357287	-	164		Uncharacterized protein		
1339	1357826	1360414	-	862		Uncharacterized protein specific for M.kandleri, contains two domains of the MK-3 family		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1340	1360653	1361492	+	279		Uncharacterized protein		
1341	1361489	1361719	+	76		Uncharacterized protein		
1342	1361829	1362332	+	167		Uncharacterized membrane protein specific for M.kandleri, MK-31 family		
1343	1364466	1365077	+	203		Uncharacterized protein specific for M.kandleri, MK-1 family		
1344	1365140	1366013	+	290		Uncharacterized domain specific for M.kandleri, MK-34 family, a fragment		
1345	1366319	1367176	-	285		Fe-S oxidoreductase	COG 0535	[R]
1346	1367297	1368256	-	319		Uncharacterized secreted protein specific for M.kandleri, MK-3 family		
1347	1368270	1368527	-	85		Uncharacterized protein		
1348	1369122	1369865	-	247		Uncharacterized domain specific for M.kandleri, MK-2 family		
1349	1369858	1370589	-	243		Uncharacterized domain specific for M.kandleri, MK-2 family		
1350	1370729	1371478	-	249		Predicted cysteine protease of the transglutaminase-like superfamily	COG 1305	[E]
1351	1371767	1375339	-	1190		Predicted protein of CobN/Mg-chelatase family	COG 1429	[H]
1352	1375488	1376102	+	204		Uncharacterized protein specific for M.kandleri, MK-35 family		
1353	1376114	1376947	+	277		Uncharacterized protein specific for M.kandleri, MK-45 family		
1354	1376796	1377713	+	305		Uncharacterized membrane protein specific for M.kandleri, MK-10 family		

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1355	1378052	1378888	+	278		Uncharacterized membrane protein specific for M.kandleri, MK-10 family		
1356	1379071	1380000	+	309		Uncharacterized membrane protein specific for M.kandleri, MK-10 family		
1357	1380143	1380862	+	239		Uncharacterized membrane protein specific for M.kandleri, MK-10 family		
1358	1381069	1381686	+	205		Putative component of a threonine efflux system	COG1280	[E]
1359	1381905	1382150	-	81		Uncharacterized protein		
1360	1382453	1383180	+	242		Uncharacterized membrane protein specific for M.kandleri, MK-10 family, a fragment		
1361	1384064	1385821	+	585		Calcineurin superfamily phosphatase or nuclease		
1362	1385837	1386457	-	206	Nth_2	A/G-specific DNA glycosylase	COG0177	[L]
1363	1387524	1389643	+	706		Predicted membrane protein specific for M.kandleri, MK-13 family, a frameshift		
1364	1389932	1392763	+	943	LeuS	Leucyl-tRNA synthetase	COG0495	[J]
1365	1392767	1393741	-	324	HmdII	N5,N10-methylenetetrahydromethanopterin dehydrogenase (H2-forming)	COG4007	[R]
1366	1393825	1395282	-	485	CCA1	tRNA nucleotidyltransferase (CCA-adding enzyme)	COG1746	[J]
1367	1395443	1396009	-	188	LigT	2'-5' RNA ligase	COG1514	[J]
1368	1396144	1397154	+	336		Predicted ATPase of the AAA+ class	COG1223	[R]
1369	1397219	1398223	-	334	SelD	Selenophosphate synthase	COG0709	[E]



SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1370	1398408	1399037	-	209	ThyA	Thymidylate synthase	COG0207	[F]
1371	1399129	1400016	-	295	SNZ1	Pyridoxine biosynthesis enzyme	COG0214	[H]
1372	1400084	1400647	+	187		Small, Ras-like GTPase	COG2229	[R]
1373	1400669	1401601	+	310		Uncharacterized protein		
1374	1401670	1402089	+	139		Uncharacterized protein		
1375	1402137	1402895	+	252	CobM	Precorrin-4 methylase	COG2875	[H]
1376	1403490	1404254	+	254	CobJ	Precorrin-3B methylase	COG1010	[H]
1377	1404218	1404622	-	134		Predicted nucleic-acid-binding protein containing a Zn-ribbon	COG1545	[R]
1378	1404635	1405819	-	394		Acetyl-CoA acetyltransferase	COG0183	[I]
1379	1405824	1406876	-	350	PksG	3-hydroxy-3-methylglutaryl CoA synthase	COG3425	[I]
1380	1406873	1407622	-	249		Predicted transcriptional regulator containing a DNA-binding HTH domain	COG1709	[K]
1381	1407623	1409290	+	555		Glycosyltransferase involved in cell wall biogenesis	COG0463	[M]
1382	1409287	1410831	+	514		Fe-S oxidoreductase	COG1032	[C]
1383	1410810	1411397	-	195		Uncharacterized membrane protein	COG1814	[S]
1384	1411404	1411694	-	96		Uncharacterized protein conserved in archaea	COG1888	[S]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1385	1411726	1412775	+	349	NifD	Nitrogenase molybdenum-iron subunit	COG 2710	[C]
1386	1412760	1413503	-	247	CitT	Di- and tricarboxylate transporter	COG 0471	[P]
1387	1413918	1414901	+	327		Predicted integral membrane protein	COG 0392	[S]
1388	1414907	1415602	+	231		Predicted ICC-like phosphoesterases	COG 1407	[R]
1389	1415734	1416798	+	354	Asd	Aspartate-semialdehyde dehydrogenase	COG 0136	[E]
1390	1416789	1417262	-	157		Predicted Rossmann fold nucleotide-binding protein	COG 1611	[R]
1391	1417522	1418286	+	254	TrpC	Indole-3-glycerol phosphate synthase	COG 0134	[E]
1392	1418283	1419104	+	273		Uncharacterized domain specific for M.kandleri, MK-33 family		
1393	1419288	1419860	-	190		Uncharacterized protein conserved in archaea	COG 4073	[S]
1394	1419851	1421071	+	406	PRI2	Eukaryotic-type DNA primase, large subunit	COG 2219	[L]
1395	1421041	1421427	-	128		Zn-ribbon-containing protein		
1396	1421429	1422007	-	192		Uncharacterized protein		
1397	1422004	1422678	-	224	RibB	3,4-dihydroxy-2-butanone 4-phosphate synthase	COG 0108	[H]
1398	1422654	1423097	-	147		Transcriptional regulator of the riboflavin/FAD biosynthetic operon	COG 1339	[K]
1399	1423066	1423941	-	291	RIO1_2	Serine/threonine protein kinase involved in cell cycle control	COG 1718	[TD]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1400	1424001	1425185	-	394	PncB	Nicotinic acid phosphoribosyltransferase	COG 1488	[H]
1401	1425410	1425775	+	121		Predicted metal-binding protein		
1402	1426225	1426971	-	248		Uncharacterized protein		
1403	1426968	1428236	-	422		Predicted P-loop ATPase		
1404	1428233	1429309	-	358		Translation elongation factor, GTPase	COG 0050	[J]
1405	1429356	1435184	-	1942		Predicted protein of the CobN/Mg-chelatase family	COG 1429	[H]
1406	1435198	1436574	-	458		Terpene cyclase/mutase family protein	COG 1657	[I]
1407	1436627	1437628	-	333		Predicted permease	COG 0701	[R]
1408	1437721	1438929	-	402		Predicted alternative 3-dehydroquinase synthase	COG 1465	[E]
1409	1438936	1439748	-	270	FbaB	Fructose-1,6-bisphosphate aldolase of the DhnA family	COG 1830	[G]
1410	1439755	1440072	-	105		Uncharacterized protein conserved in archaea	COG 3388	[S]
1411	1440119	1441096	-	325		Predicted ornithine cyclodeaminase, mu-crystallin homolog	COG 2423	[E]
1412	1441454	1442305	+	283	Kch <sub>2</sub>	NAD-binding subunit of the Kef-type K <sup>+</sup> transport systems,	COG 1226 & COG 1827	[P][R]
1413	1442302	1442811	-	169		Uncharacterized protein		

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1414	1442838	1444322	+	494	CobQ	Cobyric acid synthase	COG1492	[H]
1415	1444325	1444906	+	193		Predicted SAM-dependent methyltransferase involved in tRNA-Met maturation	COG2519	[J]
1416	1444991	1445791	-	266	NifH	Nitrogenase subunit NifH (ATPase)	COG1348	[P]
1417	1445815	1446627	+	270		Uncharacterized secreted protein	COG4086	[S]
1418	1446749	1447603	+	284	NadE	NAD synthase	COG0171	[H]
1419	1447622	1447993	+	123		Uncharacterized protein		
1420	1447990	1448730	+	246		Uncharacterized protein		
1421	1448743	1449780	+	345		Uncharacterized protein		
1422	1449777	1450604	+	275	DapB	Dihydrodipicolinate reductase	COG0289	[E]
1423	1450639	1451508	+	289		Uncharacterized protein		
1424	1452087	1454831	-	914	ValS	Valyl-tRNA synthetase	COG0525	[J]
1425	1454880	1455605	+	241		Predicted membrane protein conserved in archaea	COG4089	[S]
1426	1455566	1456741	+	391	HisC	Histidinol-phosphate/tyrosine aminotransferase	COG0079	[E]
1427	1456817	1457656	-	279		Fe-S oxidoreductase	COG0535	[R]
1428	1457683	1458321	+	212	CobL_2	Precorrin-6B methylase	COG2241	[H]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1429	1458332	1459861	+	509		Fe-S oxidoreductase	COG 1032	[C]
1430	1459862	1460179	+	105	ModE	N-terminal domain of molybdenum-binding protein	COG 2005	[R]
1431	1460163	1460975	-	270		Predicted calcineurin superfamily phosphohydrolase	COG 1409	[R]
1432	1460972	1461496	-	174		Transcription factor homologous to NACalpha-BTF3 fused to metal-binding domain	COG 4008	[K]
1433	1461502	1463100	-	532		ATPase subunit of an ABC-type transport system, contain duplicated ATPase	COG 1123	[R]
1434	1463176	1463880	+	234	KptA	RNA:NAD 2'-phosphotransferase	COG 1859	[J]
1435	1463867	1464556	+	229	Nfi	Deoxyinosine 3'endonuclease (endonuclease V)	COG 1515	[L]
1436	1464534	1467488	+	984	Top5	Topoisomerase V		
1437	1467491	1468675	-	394	CsdB	Selenocysteine lyase	COG 0520	[E]
1438	1468781	1469572	-	263		Predicted RNA methylase	COG 2263	[J]
1439	1469870	1472335	+	821		Uncharacterized membrane protein specific for M.kandleri, MK-13 family		
1440	1472310	1473566	-	418	LeuC_1	3-isopropylmalate dehydratase large subunit	COG 0065	[E]
1441	1473643	1474941	+	432		Replication factor A (ssDNA-binding protein)	COG 1599	[L]
1442	1474919	1475872	+	317	RadA_2	RadA recombinase	COG 0468	[L]
1443	1475944	1477071	+	375		Dehydrogenase (flavoprotein)	COG 0644	[C]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1444	1477068	1477274	-	68	RPL24A	Ribosomal protein L24E	COG2075	[J]
1445	1477287	1477511	-	74	RPS28A	Ribosomal protein S28E/S33	COG2053	[J]
1446	1477629	1478021	+	130	RPS6A	Ribosomal protein S6E (S10)	COG2125	[J]
1447	1478058	1479296	+	412		Translation initiation factor 2, gamma subunit (eIF-2gamma; GTPase)	COG5257	[J]
1448	1479303	1479695	+	130		Predicted RNA-binding protein containing PIN domain	COG1412	[R]
1449	1479700	1480290	+	196	MenG	Demethylmenaquinone methyltransferase	COG0684	[H]
1450	1480295	1480825	+	176	Ppa	Inorganic pyrophosphatase	COG0221	[C]
1451	1480832	1481383	+	183	RpoE1	DNA-directed RNA polymerase subunit E'	COG1095	[K]
1452	1481625	1481819	+	64	RpoE2	DNA-directed RNA polymerase subunit E''	COG2093	[K]
1453	1481816	1482391	+	191		Uncharacterized protein conserved in archaea	COG1909	[S]
1454	1482334	1482684	+	116	RPS24A	Ribosomal protein S24E	COG2004	[J]
1455	1482701	1482883	+	60	RPS31	Ribosomal protein S27AE	COG1998	[J]
1456	1482944	1483564	+	206		Mn2+-dependent serine/threonine protein kinase	COG3642	[T]
1457	1483561	1484421	-	286		Uncharacterized protein		
1458	1484461	1485501	+	346	QRI7	O-sialoglycoprotein endopeptidase	COG0533	[O]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1459	1485851	1486678	+	275		Uncharacterized protein		
1460	1486724	1488307	+	527	SerS	Seryl-tRNA synthetase	COG 0172	[J]
1461	1488365	1489000	+	211	RPS1A	Ribosomal protein S3AE	COG 1890	[J]
1462	1489038	1490084	+	348		Predicted RNA-binding protein, contains THUMP domain	COG 1818	[R]
1463	1490418	1491233	+	271		Predicted TIM-barrel enzyme	COG 0434	[R]
1464	1491224	1491904	+	226		Predicted nucleotidyltransferase of the DNA polymerase beta superfamily	COG 2413	[R]
1465	1491877	1492431	-	184	UbiX	3-polyprenyl-4-hydroxybenzoate decarboxylase	COG 0163	[H]
1466	1492501	1493112	-	203		Uncharacterized membrane protein		
1467	1493235	1493510	+	91		Uncharacterized protein conserved in archaea	COG 4009	[S]
1468	1493507	1494061	+	184		Uncharacterized protein conserved in archaea	COG 4010	[S]
1469	1494113	1494733	+	206		Predicted phosphoesterases, related to the lcc protein	COG 2129	[R]
1470	1494730	1495332	+	200		Predicted HD superfamily hydrolase	COG 1418	[R]
1471	1495427	1495882	+	151	RpsM	Ribosomal protein S13	COG 0099	[J]
1472	1495896	1496456	+	186	RpsD	Ribosomal protein related to S4	COG 0522	[J]
1473	1496474	1496887	+	137	RpsK	Ribosomal protein S11	COG 0100	[J]



SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1474	1496884	1497711	+	275	RpoA	DNA-directed RNA polymerase alpha subunit	COG0202	[K]
1475	1497708	1498091	+	127	RPL18A	Ribosomal protein L18E	COG1727	[J]
1476	1498106	1498585	+	159	RplM	Ribosomal protein L13	COG0102	[J]
1477	1498586	1498990	+	134	RpsI	Ribosomal protein S9	COG0103	[J]
1478	1499006	1499224	+	72	RPB10	DNA-directed RNA polymerase, subunit N	COG1644	[K]
1479	1499506	1500867	+	453		Uncharacterized protein specific for M.kandleri, MK-39 family		
1480	1501160	1502089	+	309	PyrB	Aspartate carbamoyltransferase, catalytic subunit	COG0540	[F]
1481	1502086	1502556	+	156	PyrI	Aspartate carbamoyltransferase, regulatory subunit	COG1781	[F]
1482	1502646	1503560	+	304		Transcriptional regulator of the LysR family	COG0583	[K]
1483	1504035	1505579	-	514	FolP	Dihydropteroate synthase	COG0294	[H]
1484	1505554	1506294	-	246		Archaea-specific flavoprotein	COG1036	[C]
1485	1506320	1506547	-	75	MtrF	N5-methyl-tetrahydromethanopterin:coenzyme M methyltransferase, subunit F	COG4218	[H]
1486	1506670	1507077	-	135		Uncharacterized conserved protein	COG1786	[S]
1487	1507201	1507398	-	65	MtrA	Methyl coenzyme M reductase, alpha subunit, fragment	COG4058	[H]
1488	1507688	1508737	+	349		Fe-S oxidoreductase, related to NifB/MoaA family	COG1625	[C]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1489	1508860	1509792	+	310	CofD	2-phospho-L-lactate transferase	COG0391	[S]
1490	1509797	1510498	+	233	NfnB	Nitroreductase	COG0778	[C]
1491	1510584	1511174	+	196		Methylase of polypeptide chain release factors	COG2890	[J]
1492	1511252	1511560	+	102	CutA	Uncharacterized protein involved in tolerance to divalent cations	COG1324	[P]
1493	1511580	1512938	-	452	HypE_1	Hydrogenase maturation factor	COG1973	[O]
1494	1513509	1513742	+	77		Uncharacterized protein specific for M.kandleri, MK-20 family		
1495	1513859	1514368	-	169	CysG_1	Siroheme synthase (precorrin-2 oxidase/ferrochelatase domain)	COG1648	[H]
1496	1514479	1515249	-	256		Uncharacterized protein		
1497	1515253	1516320	-	355		Uncharacterized protein conserved in archaea	COG4012	[S]
1498	1516295	1516912	-	205		Archaea-specific kinase related to aspartokinase	COG2054	[R]
1499	1517027	1517572	-	181	HyaD_1	Ni,Fe-hydrogenase maturation factor	COG0680	[C]
1500	1517569	1518687	-	372		Pyridoxal-phosphate-dependent enzyme related to glutamate decarboxylase	COG0076	[E]
1501	1518684	1519490	-	268		Predicted transcriptional regulator containing a DNA-binding HTH domain	COG1497	[K]
1502	1519494	1519919	-	141		Predicted transcriptional regulator containing the CopG/Arc/MetJ DNA-binding domain and a 3H domain	COG0864	[K]
1503	1519963	1520475	-	170		Uncharacterized conserved protein	COG1986	[S]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1504	1520450	1520923	-	157		Predicted nucleotidyltransferase of the HIGH superfamily	COG 1019	[R]
1505	1520920	1521717	-	265		Predicted ATPase of the PP-loop superfamily	COG 1365	[R]
1506	1521830	1522651	-	273		Uncharacterized conserved protein	COG 1430	[S]
1507	1522677	1523396	+	239		Uncharacterized conserved protein	COG 1624	[S]
1508	1523389	1524582	+	397		Archaeal S-adenosylmethionine synthetase	COG 1812	[E]
1509	1524636	1526012	-	458	Ans B	L-asparaginase	COG 0252	[EJ]
1510	1526044	1526646	+	200	HisH	Glutamine amidotransferase	COG 0118	[E]
1511	1526643	1527143	+	166		Predicted metabolic regulator containing V4R domain	COG 1719	[R]
1512	1527145	1527771	+	208		Predicted serine protein kinase homologous to HPr protein kinase, contains a Zn-ribbon	COG 1493	[T]
1513	1527775	1528134	+	119		Uncharacterized protein conserved in archaea		
1514	1528140	1528403	+	87		Uncharacterized conserved protein	COG 1873	[S]
1515	1528916	1529248	+	110		Predicted transcriptional regulator of the ArsR family	COG 0640	[K]
1516	1529214	1530110	-	298	CbiB	Cobalamin biosynthesis protein CobD/CbiB	COG 1270	[H]
1517	1530110	1531141	-	343	DPH 2	Diphthamide synthase subunit DPH2	COG 1736	[J]
1518	1531169	1531531	+	120	CbiG	Cobalamin biosynthesis protein CbiG	COG 2073	[H]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1519	1531570	1532046	+	158		Uncharacterized protein conserved in archaea		
1520	1532641	1533588	-	315	Dcm	Site-specific DNA methylase	COG 0270	[L]
1521	1533710	1534465	+	251		ABC-type molybdate transport system, periplasmic component	COG 0725	[P]
1522	1534462	1535247	+	261		ABC-type molybdate transport systems, permease component	COG 0555	[O]
1523	1535234	1535920	+	228		ABC-type molybdate transport systems, ATPase component	COG 3839	[G]
1524	1535907	1537154	+	415	Moe A	Molybdopterin biosynthesis enzyme	COG 0303	[H]
1525	1537248	1537487	+	79	Fwd G	Ferredoxin	COG 1145	[C]
1526	1537502	1537897	+	131	Fwd D	Formylmethanofuran dehydrogenase subunit D	COG 1153	[C]
1527	1537981	1539282	+	433	Fwd B_2	Formylmethanofuran dehydrogenase subunit B, selenocysteine containing	COG 1029	[C]
1528	1539400	1539711	+	103		Zn-ribbon-containing protein		
1529	1539750	1541495	+	581	Fwd A	Formylmethanofuran dehydrogenase subunit A	COG 1229	[C]
1530	1541523	1542326	+	267	Fwd C	Formylmethanofuran dehydrogenase subunit C	COG 2218	[C]
1531	1542396	1542695	+	99		Uncharacterized protein conserved in archaea	COG 4013	[S]
1532	1542781	1544628	+	615		Predicted secreted protein		
1533	1544563	1546239	-	558		Squalene cyclase	COG 1657	[I]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1534	1546215	1551530	+	1771		Predicted protein of the CobN/Mg-chelatase family	COG1429	[H]
1535	1551496	1552785	-	429		Aspartokinase	COG0527	[E]
1536	1552958	1554892	-	644		P-loop ATPase of the PiIT family	COG1855	[R]
1537	1554926	1555351	-	141	Hisl_2	Phosphoribosyl-AMP cyclohydrolase	COG0139	[E]
1538	1555348	1556613	-	421	HisS	Histidyl-tRNA synthetase	COG0124	[J]
1539	1556613	1557965	-	450		tRNA/rRNA cytosine-C5-methylase	COG0144	[J]
1540	1557946	1558869	-	307	MoaA	Molybdenum cofactor biosynthesis enzyme	COG2896	[H]
1541	1558896	1559870	-	324		Uncharacterized protein conserved in archaea		
1542	1560542	1561234	+	230		Predicted Zn-dependent hydrolase of the beta-lactamase superfamily	COG2220	[R]
1543	1561292	1562038	-	248		Uncharacterized membrane protein		
1544	1562041	1563039	-	332	HypE_2	Hydrogenase maturation factor	COG0309	[O]
1545	1563101	1563502	+	133	RPS8A	Ribosomal protein S8E	COG2007	[J]
1546	1563499	1564155	-	218	HypB_2	Ni <sup>2+</sup> -binding GTPase involved in regulation of expression and maturation of hydrogenase	COG0378	[OK]
1547	1564142	1564570	-	142	HybF	Zn-finger-containing protein HypA/HybF (possibly regulating hydrogenase expression)	COG0375	[R]
1548	1564629	1565369	+	246	CysG_2	Uroporphyrinogen-III methylase	COG0007	[H]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1549	1565366	1566509	+	380	Kch_3	NAD-binding domain of the Kef-type K <sup>+</sup> transport system fused to a uncharacterized conserved domain	COG 1226 & COG 1827	[P][R]
1550	1566513	1567199	-	228	HemD	Uroporphyrinogen-III synthase	COG 1587	[H]
1551	1567196	1567507	-	103	SEC65	19 kDa subunit of the signal recognition particle	COG 1400	[U]
1552	1567473	1568744	-	423		Uncharacterized protein specific for M.kandleri, MK-38 family		
1553	1568769	1569284	+	171		Predicted allosteric regulator of homoserine dehydrogenase containing an ACT domain	COG 2061	[E]
1554	1569260	1570273	+	337	ThrA	Homoserine dehydrogenase	COG 0460	[E]
1555	1570324	1570851	-	175		Uncharacterized protein		
1556	1570848	1571285	-	145		Uncharacterized membrane protein		
1557	1571504	1571908	-	134		Predicted redox protein, regulator of disulfide bond formation	COG 1765	[O]
1558	1571926	1572834	-	302		Selenophosphate synthetase-related enzyme	COG 2144	[R]
1559	1572806	1573468	-	220		Uncharacterized protein		
1560	1573487	1574383	+	298		Predicted permease	COG 0679	[R]
1561	1574882	1575780	-	299	TrxB	Thioredoxin reductase	COG 0492	[O]
1562	1575813	1576907	-	364		Predicted flavoprotein related to choline dehydrogenase	COG 2303	[E]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1563	1576935	1577945	+	336		Uncharacterized protein		
1564	1577960	1580194	+	744	InfB_1	Translation initiation factor 2, GTPase	COG0532	[J]
1565	1580201	1580878	+	225		Uncharacterized protein		
1566	1580875	1581339	+	154	Dcd_2	Deoxycytidine deaminase	COG0717	[F]
1567	1581336	1581887	+	183		Zn-dependent hydrolase	COG0491	[R]
1568	1581884	1582210	-	108		Predicted metal-binding protein		
1569	1582270	1583277	+	335		Permease of the major facilitator superfamily	COG0477	[GE PR]
1570	1583274	1584155	+	293	MMT1	Predicted Co/Zn/Cd cation transporter	COG0053	[P]
1571	1584185	1585000	-	271		Uncharacterized protein		
1572	1584936	1585493	+	185		Uncharacterized protein		
1573	1585777	1587114	+	445	CobB_1	Cobyrinic acid a,c-diamide synthase	COG1797	[H]
1574	1587128	1587742	+	204		Metal-dependent hydrolase of the beta-lactamase superfamily	COG1237	[R]
1575	1587924	1589219	-	431		tRNA/rRNA cytosine-C5-methylase	COG0144	[J]
1576	1589278	1590753	-	491		Amino acid transporter	COG0531	[E]
1577	1590858	1591445	-	195		Uncharacterized conserved protein	COG2411	[S]



SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1578	1591464	1592075	-	203	Rps B	Ribosomal protein S2	COG 0052	[J]
1579	1592112	1592303	-	63		Ferredoxin	COG 1146	[C]
1580	1592327	1592497	-	56	Rpo Z	DNA-directed RNA polymerase subunit K/omega	COG 1758	[K]
1581	1592624	1593769	-	381		Predicted deacylase	COG 0624	[E]
1582	1593766	1594827	-	353		Uncharacterized conserved protein	COG 3367	[S]
1583	1594854	1596443	-	529	HYS 2	Archaeal DNA polymerase II small subunit, predicted phosphatase	COG 1311	[L]
1584	1596507	1597112	+	201		Uncharacterized protein		
1585	1597109	1597681	+	190		Predicted epimerase related to ribulose-5-phosphate 4-epimerase	COG 0235	[G]
1586	1597665	1598027	-	120		Uncharacterized protein conserved in archaea	COG 1698	[S]
1587	1597981	1598511	+	176		Predicted transcriptional regulator containing DNA-binding HTH domain	COG 2771 & COG 1284	[K][S]
1588	1598508	1598981	+	157		Uncharacterized Zn-finger-containing protein	COG 1645	[R]
1589	1598944	1600101	+	385		Predicted ATP-dependent carboxylase related to biotin carboxylase	COG 2232	[R]
1590	1600098	1601198	+	366	Mur F	UDP-N-acetylmuramyl pentapeptide synthase	COG 0770	[M]
1591	1601232	1601696	+	154	Ndk	Nucleoside diphosphate kinase	COG 0105	[F]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1592	160169	160301	-	442	RecJ_1	Single-stranded-DNA-specific exonuclease	COG0608	[L]
1593	160309	160354	-	149	RpsO	Ribosomal protein S15P/S13E	COG0184	[J]
1594	160355	160411	-	188		Xanthosine triphosphate pyrophosphatase	COG0127	[F]
1595	160419	160598	+	598	InfB_2	Translation initiation factor 2, GTPase	COG0532	[J]
1596	160604	160685	-	271		Metal-dependent hydrolase of the aminoacylase-2/carboxypeptidase Z family	COG3608	[R]
1597	160686	160721	-	116		Uncharacterized conserved protein	COG1990	[S]
1598	160739	160776	+	123	RPL8A	Ribosomal protein HS6-type (S12/L30/L7a)	COG1358	[J]
1599	160821	160894	+	243		Uncharacterized protein conserved in archaea		
1600	160890	161041	-	502	GuaB	IMP dehydrogenase	COG0516 & COG0517	[F][R]
1601	161048	161105	-	189		Uncharacterized membrane protein		
1602	161110	161181	-	237		Uncharacterized protein conserved in archaea	COG1891	[S]
1603	161191	161246	+	183		Uncharacterized protein		
1604	161243	161419	+	587	TopA	Topoisomerase IA	COG0550	[L]
1605	161464	161535	+	237		5-formyltetrahydrofolate cyclo-ligase	COG0212	[H]

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1606	1615336	1616505	-	389	ArgD	Ornithine/acetylornithine aminotransferase	COG4992	[E]
1607	1616509	1617411	-	300	DapA	Dihydrodipicolinate synthase/N-acetylneuraminate lyase	COG0329	[EM]
1608	1617430	1617642	-	70	RPS17A	Ribosomal protein S17E	COG1383	[J]
1609	1617635	1617913	-	92	PheA	Chorismate mutase	COG1605	[E]
1610	1617867	1618727	-	286		Archaeal shikimate kinase	COG1685	[EH]
1611	1618931	1619194	-	87		Uncharacterized protein		
1612	1619379	1620722	-	447	Ffh	Signal recognition particle GTPase	COG0541	[U]
1613	1620719	1621768	-	349	FtsY	Signal recognition particle GTPase	COG0552	[U]
1614	1621798	1622271	-	157	GIM5	Predicted prefoldin, molecular chaperone implicated in de novo protein folding	COG1730	[O]
1615	1622271	1622513	-	80	RPL20A	Ribosomal protein L20A (L18A)	COG2157	[J]
1616	1622531	1623196	-	221	TIF6	Translation initiation factor 6 (EIF6)	COG1976	[J]
1617	1623199	1623459	-	86	RPL31A	Ribosomal protein L31E	COG2097	[J]
1618	1623475	1623630	-	51	RPL39	Ribosomal protein L39E	COG2167	[J]
1619	1623644	1623997	-	117		DNA-binding protein	COG2118	[R]
1620	1624027	1624476	-	149	RPS19A	Ribosomal protein S19E (S16A)	COG2238	[J]

SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1621	1624522	1624839	-	105		Predicted RNA-binding protein containing KH domain, possibly ribosomal protein	COG1534	[J]
1622	1624826	1625212	-	128	RPR2	RNAse P subunit RPR2	COG2023	[J]
1623	1625166	1626401	+	411		Uncharacterized protein specific for M.kandleri, MK-39 family		
1624	1626335	1626904	+	189	HyaD_2	Ni,Fe-hydrogenase maturation factor	COG0680	[C]
1625	1626880	1627365	-	161		Ferredoxin fused to cHTH-type DNA-binding domain	COG1145	[C]
1626	1627362	1628921	-	519		Membrane protein implicated in protein export	COG2244	[R]
1627	1628934	1629821	-	295	IlvE	Branched-chain amino acid aminotransferase	COG0115	[EH]
1628	1630003	1631064	+	353		Uncharacterized protein		
1629	1631048	1631341	+	97		Uncharacterized protein		
1630	1631366	1632712	-	448		tRNA/rRNA cytosine-C5-methylase	COG0144	[J]
1631	1632739	1633479	+	246	ArgB	Acetylglutamate kinase	COG0548	[E]
1632	1633413	1633727	+	104		Uncharacterized protein conserved in archaea	COG1849	[S]
1633	1633814	1634437	+	207		Uncharacterized protein		
1634	1634606	1635241	-	211		Zn-dependent hydrolase	COG0491	[R]
1635	1635284	1636138	+	284		N6-adenine-specific DNA methylase		

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1636	1636477	1637091	-	204		Uncharacterized protein specific for M.kandleri, MK-1 family		
1637	1637295	1637957	-	220		Orphan DOD family homing endonuclease	COG 1372	[L]
1638	1637857	1638960	-	367		Orphan DOD family homing endonuclease	COG 1372	[L]
1639	1639406	1640485	+	359		Uncharacterized conserved protein	COG 1679	[S]
1640	1640674	1641513	-	279		Uncharacterized protein		
1641	1641667	1642548	+	293	FtsJ	23S rRNA methylase	COG 0293	[J]
1642	1642496	1642894	-	132	Cps B_2	Mannose-6-phosphate isomerase	COG 0662	[G]
1643	1642891	1644282	-	463	Cob B_2	Cobyrinic acid a,c-diamide synthase	COG 1797	[H]
1644	1644369	1644533	+	54		Uncharacterized protein		
1645	1644717	1645973	-	418		Predicted dehydrogenase (flavoprotein)	COG 0644	[C]
1646	1646079	1647389	-	436		Predicted pseudouridylate synthase	COG 1258	[J]
1647	1647793	1649076	+	427	Eno	Enolase	COG 0148	[G]
1648	1649073	1650479	-	468		Uncharacterized membrane protein		
1649	1650476	1651831	-	451	PurF	Glutamine phosphoribosylpyrophosphate amidotransferase	COG 0034	[F]
1650	1652250	1655972	-	1240		Archaeal DNA polymerase II, large subunit	COG 1933	[L]

SEQ ID NO.	Start	Stop	Status	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1651	1656406	1657362	-	318	SplB	DNA photolyase	COG1533	[L]
1652	1657359	1658759	-	466	LldP	L-lactate permease	COG1620	[C]
1653	1658795	1659637	+	280		Uncharacterized protein		
1654	1659793	1660500	-	235		ATPase subunit of a ABC-type transport system involved in lipoprotein release	COG1136	[M]
1655	1660512	1661624	-	370		Permease subunit of a ABC-type transport system involved in lipoprotein release	COG0577	[M]
1656	1661638	1662354	-	238		Archaea-specific Zn-finger-containing protein	COG1326	[R]
1657	1662382	1662804	+	140		Uncharacterized protein conserved in archaea	COG2090	[S]
1658	1662954	1663568	-	204		Predicted RNA-binding protein	COG1491	[J]
1659	1663572	1663961	-	129		Uncharacterized protein conserved in archaea	COG1460	[S]
1660	1663977	1664285	-	102	RPL21A	Ribosomal protein L21E	COG2139	[J]
1661	1664287	1664700	-	137		RecB-family nuclease	COG4080	[L]
1662	1664704	1665924	-	406	Pgk	3-phosphoglycerate kinase	COG0126	[G]
1663	1665945	1666487	-	180		Predicted sugar phosphate isomerase involved in capsule formation	COG0794	[M]
1664	1666501	1667181	-	226	TpiA	Triosephosphate isomerase	COG0149	[G]
1665	1667190	1667828	-	212	RpiA	Ribose 5-phosphate isomerase	COG0120	[G]

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1666	1667891	1669519	+	542	CarB_3	Carbamoylphosphate synthase large subunit	COG 0458	[EF]
1667	1669535	1670410	+	291	PrsA	Phosphoribosylpyrophosphate synthetase	COG 0462	[FE]
1668	1670607	1670876	+	89		Uncharacterized protein conserved in archaea	COG 4014	[S]
1669	1670877	1671116	-	79		Uncharacterized conserved protein	COG 1873	[S]
1670	1671113	1671736	-	207		GTP:adenosylcobinamide-phosphate guanylyltransferase	COG 2266	[H]
1671	1671733	1672458	-	241	CobS	Cobalamin-5-phosphate synthase	COG 0368	[H]
1672	1672455	1673528	-	357	PgpA	Predicted phosphatidglycerophosphatase A fused to a uncharacterized conserved domain	COG 1865 & COG 1267	[S][I]
1673	1673554	1676526	+	990	NtpB	Archaeal/vacuolar-type H <sup>+</sup> -ATPase subunit B, contains an intein	COG 1156 & COG 1372	[C][L]
1674	1676578	1677276	+	232	NtpD	Archaeal/vacuolar-type H <sup>+</sup> -ATPase subunit D	COG 1394	[C]
1675	1677295	1677675	+	126		Uncharacterized conserved protein	COG 1417	[S]
1676	1677675	1678118	+	147		Uncharacterized protein conserved in archaea	COG 2083	[S]
1677	1678361	1678825	+	154	HHT1_3	Histone H3/H4	COG 2036	[L]
1678	1678882	1681107	-	741	MPH1/MUS81	ERCC4-like helicase-nuclease	COG 1111 & COG 1948	[L][L]



SEQ ID NO.	Start	Stop	Strand	No. of Amino Acids	Gene	Function	Homology Group	Functional Class
1679	1681086	1681853	-	255		Predicted nucleotide kinase	COG 4088	[F]
1680	1681881	1682882	+	333	ArsA	Predicted ATPase involved in chromosome partitioning	COG 0003	[D]
1681	1682894	1683577	+	227		Predicted phosphatase of the PHP family	COG 1387	[ER]
1682	1683574	1686540	-	988	RtcB	Uncharacterized conserved protein, contains a DOD family homing endonuclease insertion	COG 1690 & COG 1372	[S][L]
1683	1686554	1687210	-	218		Uncharacterized conserved protein	COG 3382	[S]
1684	1687182	1687805	-	207		SAM-dependent methyltransferase	COG 0500	[QR]
1685	1687856	1688686	+	276		Uncharacterized protein		
1686	1688751	1689122	+	123		Uncharacterized conserved protein	COG 1504	[S]
1687	1689119	1689883	-	254	PstB	ABC-type phosphate transport system, ATPase component	COG 1117	[P]
1688	1689888	1691672	-	288	PstA	ABC-type phosphate transport system, permease component	COG 0581 & COG 0573	[P][P]
1690	1691739	1692728	-	329	PstS	ABC-type phosphate transport system, periplasmic component	COG 0226	[P]
1691	1692804	1693688	+	294		Predicted ATPase of the PP-loop superfamily implicated in cell cycle control	COG 0037	[D]
1692	1693706	1694500	+	264		Predicted ATPase of the PP-loop superfamily implicated in cell cycle control	COG 0037	[D]